

Materials for a Flora of the Malayan Peninsula, No. 23.—By J. SYKES
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This Part, continuing the Monochlamydeæ, deals with the Families Nos. 100 Myristicaceæ, 101 Monimiaceæ, 105 Thymelæaceæ (including 105 *bis* Gonystylaceæ which should properly have come in Thalamifloræ near Tiliaceæ), 106 Elæagnaceæ and 108 Santalaceæ (including the genus *Champereia* which should properly have come in Opiliaceæ), all the work of Mr. Gamble. In the descriptions of Myristicaceæ he has closely followed the recent Monograph of the whole Family by Dr. Warburg of Berlin (*Nova Acta Acad. Leop.-Carol. Bot. LXVIII*); and in Monimiaceæ he has followed that of Miss Janet Perkins in Engler's 'Pflanzenreich' so that there are no new genera or species. In Thymelæaceæ there is one new species and in Santalaceæ there are four, making five in all. The Latin descriptions of these species have been published in the *Kew Bulletin*.

Altogether, in the 6 Families described there are 16 genera and 73 species of which, as above mentioned, 5 species are new.

The next part, No. 24, will contain, with other Families, the description of the Family Piperaceæ (No. 98) by Monsieur Casimir de Candolle of Geneva, who has described a large number of new species.

Family C.—MYRISTICACEÆ.

Evergreen trees, often stellately-tomentose, sometimes with branching hairs. *Leaves* alternate, entire, penni-nerved, sometimes pellucid-punctate, exstipulate. *Flowers* dioecious, small, regular, bracteate, in axillary or lateral (from scars of fallen leaves) panicles, cymes, umbels or fascicles, rarely in racemes; bracteoles persistent or caducous; perianth gamophyllous, inferior, with 3 (sometimes 2 or 4) lobes valvate in bud; androecium of 3—18 (or even —30 or more) extrorse anthers, connate in a sessile or stipitate column, head, ring or disc, sessile or sometimes with short filaments; anthers 2-celled, linear or ovate; ovary superior, free, sessile, 1-celled; stigma capitate, discoid or lobed; ovule 1 basal, erect, anatropous. *Fruit* more or less fleshy, splitting usually into 2, sometimes into 4, valves. *Seed* erect, enclosed in a thin or fleshy, entire or lacerate, usually highly coloured, often aromatic arillus; testa usually thick; albumen copious, hard,

usually runcate; embryo very small, basal; cotyledons divaricate, flat or crumpled; radicle short, inferior.—DISTRIBUTION: Tropical regions of Asia and Australia (181), America (38), and Africa (16), 235 species (Warburg).

Anthers attached more or less by their backs to a column formed of the connate filaments.

Anther column sessile

Anthers completely attached to the column; arillus entire or nearly so 1. HORSFIELDIA.

Anthers attached to the column by their lower parts only, their apices free; arillus laciniate almost to the base 2. GYMNACRANTHERA.

Anther column stipitate, and usually produced beyond the anthers, which are completely attached to it; arillus laciniate almost to the base 3. MYBISTICA.

Anthers attached by their bases stellately to a peltate usually stipitate column formed of the connate filaments; arillus laciniate at the apex only or not at all (except *K. retusa*) 4. KNEMA.

1. HORSFIELDIA, Willd.

Dioecious trees with evergreen chartaceous glabrous *leaves*, the main nerves joining near the margin, the transverse nervules obscure. *Inflorescence* of loose (at any rate the ♂) usually compound panicles; bracts sometimes large, usually caducous; flowers small, globose or subclavate, pedicellate or rarely sessile, bracteoles 0; perianth 2—4-toothed. *Andræcium* sessile or subsessile; filaments combined in a globose or clavate column; anthers 12—30 completely attached to the column by their backs. *Stigmas* very small, sessile, connate. *Fruit* globose or ovoid-globose; pericarp leathery, rarely succulent; arillus entire or scarcely laciniate. *Seed* conform to the fruit; testa thin, woody; albumen runcate; cotyledons connate at the base.—DISTRIB. S. Asia from India to New Guinea, species about 51.

Anthers fully touching each other.

Perianth bivalved (very rarely 3-valved) .. 1. *H. globularia*.

Perianth 3-valved for the most part at least.

Lobes of the perianth papillose within .. 2. *H. canarioides*.

Lobes of the perianth not papillose.

♂ flowers elongate or oval.

♂ flowers large, 4—5 mm. long, elongate, as long as the pedicel; leaves thickly hairy beneath 3. *H. superba*.

♂ flowers medium-sized, 2—3 mm. long, oval-globose, much shorter than the pedicel; leaves thickly hairy beneath 4. *H. flocculosa*.

- ♂ flowers medium-sized, 3 mm. long, elongate, longer than the pedicel; leaves glabrous beneath 5. *H. fulva*.
- ♂ flowers globose.
Leaves hairy.
♂ flowers somewhat longer than their pedicels; leaves usually very large, transverse nerves strongly impressed 6. *H. grandis*.
♂ flowers as long as their pedicels; leaves rather small, transverse nerves indistinct.. 7. *H. tomentosa*.
- Leaves glabrous.
Flowers large, 2 mm. long; inflorescence pubescent 8. *H. Wallichii*.
Flowers smaller, 1—5 mm. long; inflorescence nearly glabrous 9. *H. amygdalina*.
- Anthers free at the margins.
Perianth almost always 2-valved.
♂ flowers large, 2 mm. long 10. *H. majuscula*.
♂ flowers small, up to 1 mm. long.
Young branches with two raised lines; leaves thin 11. *H. Irya*.
Young branches without raised lines; leaves thick.
Inflorescence glabrous; flowers somewhat longer than their pedicels 12. *H. sucosa*.
Inflorescence pubescent; flowers somewhat shorter than their pedicels 13. *H. crassifolia*.
- Perianth 3-valved.
Young branches with two raised lines 14. *H. brachiata*.
Young branches without raised lines.
♂ inflorescence pubescent; fruit ovate, under 2 cm. long 15. *H. Lemanniana*.
♂ inflorescence weakly pubescent; fruit almost globose, over 3 cm. long 16. *H. subglobosa*.
♂ inflorescence quite glabrous; leaves thinner and narrower 17. *H. Ridleyana*.
- Species of which the ♂ flowers are unknown.*
- Fruit ovate, 5 cm. long, 3 cm. broad; leaves 15—25 cm. long, 5—8 cm. broad with 12 main nerves .. 18. *H. racemosa*.

1. *HORSFIELDIA GLOBULARIA*, Warb. Monog. Myrist. 288, t. xxi (1897). A glabrous bushy tree reaching 9—15 m. in height; branchlets cinereous, rather rough, lenticellate, uppermost with faint pairs of lines decurrent from the leaf-axils. *Leaves* thinly coriaceous; oblong, obovate-oblong or narrowly elliptic-oblong, rather abruptly acuminate at apex, cuneate at base; upper surface dark greenish-brown

when dry, lower pale brown, both puncticulate; margins slightly revolute; 15--30 cm. long, 4--10 cm. broad; midrib rather stout, flattened above, prominent and rough beneath; main nerves 11--18 pairs, rather faint and thin, at first straight then curving to vanish or join in very faint loops near the margin; reticulation obscure; petiole 1--1.5 cm. long, rather rough. *Flowers*: ♂ in axillary spreading glabrous panicles 7--16 cm. long and 7--8 cm. broad; branches many, many-flowered; pedicels 1--3 mm. long; perianth very coriaceous, transversely 2-valved, 3 mm. long, 4 mm. broad, slightly rugose outside, the margins of the valves meeting when in bud but not overlapping; andrœcium an obconic compressed sessile 2-lobed cup, bearing about 20--30 elongate linear anthers, connate from base to apex, each anther completely inflexed about the middle: ♀ in panicles much shorter than the ♂; pedicels thick; ovary glabrous, sessile, faintly bilobed. *Fruit* small, almost globose; 13 mm. long, 12 mm. broad; pericarp thick, glabrous. *Seed* 9 mm. long, 7.5 mm. broad; testa thin; arillus complete, red. *Myristica globularia*, Bl. Rumphia I. 190, t. 64, fig. 2; Miq. Fl. Ind. Bat. I. 2. 66; A. DC. Prodr. xiv. 1. 202 *in part.* *M. bivalvis*, Hook. f. in Fl. Br. Ind. v. 107; King Ann. Calc. III. 307, t. 139.

MALACCA: *Ridley*!. SINGAPORE: Garden jungle, *Murton* 149!; *Ridley* 2644!; cult. in Botanic Garden, *Ridley* 393!—DISTRIB. Java, Celebes, Amboina.

2. *HORSFIELDIA CANARIOIDES*, Warb. Monog. Myrist. 294, t. xxi (1897). A tree reaching 10--20 m. in height and up to 60 cm. in diameter of stem; branches spreading; branchlets cinereous, rough, slender, the youngest dark brown nearly glabrous; leaf-buds linear-lanceolate, puberulous, under 1 cm. long. *Leaves* thinly coriaceous; elliptic-oblong to elliptic, acute or shortly acuminate at apex, rounded and slightly oblique at base; both surfaces brown when dry, the lower slightly paler than the upper; margins revolute; 12--24 cm. long, 5--8 cm. broad; midrib moderately stout, slightly impressed and keeled above when dry; main nerves 12--15 pairs, faint on the upper, slightly prominent on the lower surface, sub-horizontal; reticulation very obscure; petiole 7--12 mm. long, stout. *Flowers*: ♂ in slender much-branched many-flowered spreading panicles from the axils of the leaves and of fallen leaves, 5--8 cm. long and as much broad; rhachises puberulous; cymules subumbellate; pedicels slender up to 4 mm. long, glabrous; perianth globose in bud, glabrous, teeth 3--5, cut nearly to the base, spreading, acute, papillose within; andrœ-

cium subsessile, turbinate, almost annular, about 1 mm. high; anthers about 10, incurved at tip: ♀ in lax spreading slender panicles 15—23 cm. long, not otherwise known. *Fruit* oblong-ovoid, blunt at the apex, slightly narrowed at the base; 6—8 cm. long, about 3 cm. in diam., glabrous; pericarp leathery, 6 mm. thick. *Seed* 5 cm. long, cylindric-elliptic, the apex subapiculate, the base rounded; testa smooth with bold longitudinal coloured markings; arillus thin, fleshy, extending to the apex, slightly lacinate, occasionally with wide areolæ at the sides. *Myristica* sp. Hook. f. in Fl. Br. Ind. V. 13 (Coll. *Maingay*). *M. canarioides*, King Ann. Calc. III. 304, t. 134.

PERAK: at Ulu Bubong and Ulu Bera at 120—240 m. alt., *King's Collector* 10064!, 10194!, 10562!, 10816!, 108451!. MALACCA: *Maingay* K.D. 1298!; at Lubok Kedondong, *Ridley* 3313!. SINGAPORE: at Sungei Turong, Bukit Mandai and Stagmount, *Ridley* 6095!, 8426!, 8906!, 11270!.

3. *HORSFIELDIA SUPERBA*, Warb. Monog. Myrist. 295 (1897). A tree reaching 12—15 m. in height and probably considerably more ('a lofty tree' *Ridley*); branches spreading; branchlets very stout, cinereous-brown, rough, prominently marked with the large scars of fallen leaves, the younger ones covered, as are the undersurfaces of the leaves and the panicles, with loose scurfy bright rufous minute stellate tomentum; buds lanceolate, 3 cm. long. *Leaves* large, coriaceous; elliptic to elliptic-lanceolate or oblanceolate, acute or shortly acuminate at apex, attenuate and slightly unequal at base; upper surface when young densely tomentose, ultimately glabrous except the midrib, somewhat shining, lower dull; margins slightly revolute when dry; 25—70 cm. long, 10—22 cm. broad; midrib very stout; main nerves 15—30 pairs, impressed on the upper, very prominent and almost winged on the lower surface when dry, spreading, straight at first, inter-arching near the margin; reticulation obscure; petiole 12—25 mm. long, very stout. *Flowers*: ♂ in robust branching panicles from the scars of fallen leaves, 10—15 cm. long; branches many, 2—5 cm. long with somewhat flattened peduncles; flower clusters subumbellate; pedicels up to 1 cm. long; perianth leathery, ellipsoid or slightly obovoid, obtuse, 6—8 mm. long, teeth 3—4, triangular; androecium shorter than the perianth, obtuse, ovoid; anthers nearly 20, quite connate: ♀ in stout woody racemes 2—5 or more cm. long, the rachis woody, pale, rufous tomentose; perianth coriaceous, glabrous, widely tubular with 2—3 shallow acute teeth; ovary ovoid, slightly oblique, glabrous, grooved; stigma flat. *Fruit*

ovoid-globose, rough, warted, glabrescent, 6—8 cm. long and nearly 5 cm. in diam.; peduncle stout, woody, 10—12 mm. long; pericarp succulent, 12—18 mm. thick. *Myristica superba*, Hook. f. and Th. Fl. Ind. 162; A. DC. in Prodr. xiv. 1. 194; Miq. Fl. Ind. Bat. I. 2. 62; Hook. f. Fl. Br. Ind. V. 105; King Ann. Calc. III. 298 tt. 124 bis, 125 bis.

PENANG: *Phillips!*; at Waterfall, *Curtis* 2966!. PERAK: *Scortechini!*; near Gunong Batu Puteh at 450—600 m. alt., *King's Collector* 8024!. SELANGOR: at Ulu Selangor, *Goodenough* 10526!. MALACCA: *Hervey!*; at Jasin, *Holmberg* 2100!. SINGAPORE: at Sungei Benkang, *Ridley* 210!.

4. *HORSFIELDIA FLOCCULOSA*, Warb. Monog. Myrist. 297 (1897). A handsome tree reaching 12—20 m. in height and 25—50 cm. in diam. of stem; branches spreading; branchlets stout, when young densely clothed with thick felted bright rufous tomentum, when old subglabrous, striate, rough and cinereous. *Leaves* large, coriaceous; oblong-lanceolate or oblanceolate, acute or acuminate at apex, rounded or slightly cuneate at base; upper surface hispid puberulous, the midrib and nerves flocculent-tomentose when young ultimately glabrous, lower densely covered with pale cinnamomeous stellate flocculent tomentum; margins revolute when dry; 30—45 cm. long, 10—18 cm. broad; midrib very stout; main nerves 15—20 pairs, impressed on the upper, boldly prominent on the lower surface, rather straight at first but inter-arching near the margin; transverse nervules faint, slightly impressed on the upper surface; reticulation obscure; petiole 1—2 cm. long, very stout, tomentose. *Flowers*: ♂ in robust spreading many-flowered panicles from the axils of fallen leaves, 15—20 cm. long, 8—10 cm. broad; rhachises and peduncles flocculently cinnamomeous-tomentose; cymules rather loose; pedicels slender, clavate, 3—4 mm. long; perianth obovoid, thin, glabrous, 3 mm. long, teeth 3—4, shallow, acute; andrœcium subsessile, obovoid, truncate at apex, 2 mm. high; anthers about 10, confluent and incurved at top: ♀ not known. *Fruit* unknown. *Myristica flocculosa*, King Ann. Calc. III. 302, t. 131.

PERAK: in dense forest near Ulu Kerling at 120—180 m. alt., *King's Collector* 8618!.

5. *HORSFIELDIA FULVA*, Warb. Monog. Myrist. 297 (1897). A tree, reaching 12—15 m. in height; branchlets rather stout, pale brown, slightly rough, scurfy, rufous-puberulous when young.

Leaves coriaceous; elliptic-oblong, often obovate, acute at apex, attenuate at base; both surfaces glabrous, dull, reddish-brown when dry, the lower the paler; margins recurved; 10—17 cm. long, 4—6 cm. broad; midrib stout, scurfy, rufous-puberulous on both surfaces; main nerves 12—14 pairs, stout, straight at first, curved near the margin; reticulation obscure; petiole 6—10 mm. long, rufous-puberulous, thick. *Flowers*: ♂ from the young branchlets below the leaves in crowded spreading many-flowered scurfy stellate-pubescent rufous panicles, 5—8 cm. long; ultimate branchlets subumbellate; pedicels slender, 2 mm. long; perianth obovoid, 4—5 mm. long, glabrous on both surfaces, divided for $\frac{1}{3}$ or $\frac{1}{4}$ of its length into 3 broadly triangular teeth; andrœcium sessile, cylindrical, slightly apiculate; anthers about 10, connate from base to apex: ♀ not known. *Fruit* from the branchlets below the leaves, solitary, on woody warted often curved peduncles 12 mm. long or more, ovoid, compressed, slightly pointed, glabrous, 2.5 cm. long, 2 cm. in diam.; pericarp thick, yellowish, subsucculent, dehiscing in 2 divaricating valves. *Seed* broadly ovoid; testa thin, shining, the rugulose albumen appearing through it; arillus reddish-orange, thin, tough, entire, completely enveloping the seed. *Myristica fulva*, King Ann. Calc. III. 297, t. 124.

PERAK: at Goping, *Scortechini* 184!. MALACCA: *Maingay* K. D. 1304!.

VAR. *paludicola*, Warb. l.c. *Leaves* slightly appressed puberulous beneath; petiole 1.5—3 cm. long. *Flowers*: ♀ in lateral ferruginous-puberulous panicles 4—8 cm. long; rhachis stout, angular or flattened, as are the branches; perianth ovoid obtuse, 2-lobed, the lobes prominently persistent and recurved in fruit. *Myristica paludicola*, King Ann. Calc. III. 328, t. 169.

PERAK: in wet ground, at low elevations, *King's Collector* 4267!, 4706!, 6688!; *Wray* 3071!. SINGAPORE: at Selitar, *Ridley* 6126!

This may be merely the ♀ form of *H. fulva*.

6. *HORSFIELDIA GRANDIS*. Warb. Monog. Myrist. 301 (1897). A small tree, reaching 6—9 m. in height and 15—20 cm. in diam. of stem; branchlets stout, at first densely rufous-tomentose, afterwards striated, tomentose on the ridges and glaucous in the furrows, ultimately glabrous with rough striated reddish-brown bark. *Leaves* large, thinly coriaceous; elliptic-oblong, very shortly and suddenly acuminate or blunt at apex, rounded or slightly cune-

ate and often unequal at base; upper surface bullately reticulate, scabrid from numerous short stiff branching hairs, glabrescent when old, lower surface densely and uniformly covered with bright reddish-brown stellate tomentum; margins slightly revolute when dry; 25—40 cm. long, 10—20 cm. broad; midrib stout, rather broad and strong, densely tomentose beneath; main nerves 16—19 pairs, spreading and arching within the margin, impressed on the upper, prominent on the lower surface; transverse nervules very prominent, impressed above, raised beneath and joined by an irregular prominent reticulation; petiole 2·5—6 mm. long, stout. *Flowers*: ♂ in branching many-flowered panicles 18—25 cm. long, 6—8 cm. broad, from the axils of leaves or of fallen leaves; rhachis and branches densely pale rufous-lanate; cymules dense; pedicels very short, 1 mm. long; perianth globose, 1—2 mm. in diam., glabrous, black-dotted, teeth 3—4 triangular; andrœcium sessile, turbinate, depressed, 1·5 mm. in diam., 1 mm. high; anthers about 13—15, much incurved at the apex: ♀ not known. *Fruit* unknown. *Myristica grandis*, Hook. f. in Trans. Linn. Soc. xxiii, 157 (1860). *M. rubiginosa*, King Ann. Calc. III. 302, t. 130.

SINGAPORE: in dense forest, *King's Collector* 1233!; in garden jungle, *Ridley* 4132!—DISTRIB. Borneo.

7. *HORSFIELDIA TOMENTOSA*, Warb. Monog. Myrist. 302 (1897). A tree, reaching 9—18 m. or more in height and about 45 cm. in diam. of stem; branches spreading; branchlets rather slender, rusty-stellate-tomentose as are the undersurfaces of the leaves and the inflorescence branches; leaf-buds lanceolate, about 1 cm. long. *Leaves* submembranaceous or rather thicker; elliptic or elliptic-obovate or oblanceolate, acute or abruptly acuminate at apex, cuneate, attenuate or sometimes rounded or even subcordate at base; upper surface glabrous, dull brown when dry, lower reddish-brown, glabrescent when old; 12—25 cm. long, 5—9 cm. broad; midrib rather slender; main nerves 12—15 pairs, straight at first, curved near the margin, slightly prominent on both surfaces; reticulation obscure; petiole about 15 mm. long, slender. *Flowers*: ♂ in many-branched many-flowered panicles up to 10 cm. long; branches spreading, laxly rufous-tomentose, ending in densely-flowered cymules; pedicels 1—1·5 mm. long, slender; perianth depressed-globose, thin, glabrous, 2—2·5 mm. in diam., divided halfway into 3—4 broad triangular acute teeth; andrœcium sessile, depressed-globose, 2 mm. in diam., 1 mm. high; anthers 10—15, much incurved at either end; ♀ not known,

the young fruits in short solitary 8—10-flowered racemes. *Fruit* in lax racemes of 3—5, 2—2.5 cm. long, ovoid, slightly flattened, ridged along the suture, subglabrous; pericarp fleshy; pedicel about 6 cm. long. *Seed* ovoid; testa crustaceous, shining; arillus fleshy, entire, not lacinate or areolate, embracing the whole seed. *Myristica tomentosa*, Hook. f. and Th. Fl. Ind. 161 (1855); Hook. f. Fl. Br. Ind. V. 105; A. DC. in Prodr. XIV. 204; Miq. Fl. Ind. Bat. I. 2. 68; King Ann. Calc. III. 301, t. 129. *Myristicaceae*, Wall. Cat. 9025. *Myristica Horsfieldia*, Wall. Cat. 6806 (*in part*).

KEDAH: at Yan, *Ridley* 5489!. PENANG: *Porter* (*Wallich* 9025!); *Phillips*!; at Pulau Boetong, *Curtis* 1197!, 1748!; *Ridley* 7205!, 10240!, 10787!. SELANGOR: at Weld's Hill, *Burn-Murdoch* 44!. PERAK: in bamboo and other forest up to about 250 m. alt., *King's Collector* 4165!, 5671!, 6102!, 7998!, 8642!, 10386!, 10557!. MALACCA: *Maingay* K.D. 1284; at Sungei Jernoh, *Derry* 967!; at Chaban Woods, *Ridley* 3171!.

8. *HORSFIELDIA WALLICHII*, Warb. Monog. Myrist. 305 (1897). A large tree, reaching a height of 30 m. or more and 60—80 cm. in diam. of stem; branchlets stout, rough, with dark grey channelled bark, the youngest minutely rusty-tomentose; leaf-buds lanceolate, 1—2 cm. long. *Leaves* coriaceous; oblong and acute at apex or rarely elliptic and blunt, the base rounded, subtruncate or subcordate; upper surface shining, greenish-brown, glabrous, lower rufous-brown, loosely and deciduously stellate-tomentose; margins revolute; oblong forms 25—35 cm. long and 7—11 cm. broad, elliptic forms 15—20 cm. long and about 10 cm. broad; midrib stout, flattened or somewhat channelled above; main nerves 16—22 pairs in the oblong, 10—12 in the elliptic forms, stout, impressed above, straight at first, curved and looped together near the margin; transverse nervules arched, visible on the lower surface; reticulation obscure; petiole 1—2 cm. long, stout, channelled. *Flowers*: ♂ in long stout spreading many-flowered rufous-tomentose panicles 10—30 cm. long from the axils of the leaves or of fallen leaves; branches thick, with subumbellate cymules, pedicels very short, tomentose; perianth fleshy, glabrous, globose, 2—3 mm. in diam., teeth 3—4, triangular, acute; andrœcium sessile, ovate- or obovate-globose, depressed at apex, 2 mm. high; anthers about 15, incurved, confluent: ♀ in panicles like the ♂ but stouter, shorter and fewer-flowered, the flowers larger: perianth coriaceous, tomentose externally at the base otherwise glabrescent; teeth 3, spreading; ovary

globose, sessile, glabrous; stigma sessile, small, linear. *Fruit* (quite young) ovoid, smooth, on a short stout pedicel, the slightly enlarged perianth persistent at the base, (old) obovoid, finely rugose, 5—6 cm. long, 3—5 cm. in diam. *Myristica Wallichii*, Hook. f. and Th. Fl. Ind. 161 (1855); A. DC. Prodr. xiv. 203; Miq. Fl. Ind. Bat. I. 2, 67; Hook. f. Fl. Br. Ind. V. 105; King Ann. Calc. III. 303, tt. 132, 133 (excl. syn. *crassifolia*, Hook. f. and Th.). *M. Horsfieldia*, Wall. (not of Bl.) Cat. 6806, *in part*.

PROVINCE WELLESLEY: at Kubang Ulu, *Curtis* 2423! PERAK: *Scortechini* 246!; in hilly forest near Goping at 150—250 m. alt., *King's Collector* 4837!. MALACCA: *Maingay* K.D. 1284! SINGAPORE: *Wallich*, 6806, *in part*!; *Murton* 1481!; *Maingay* K.D. 1283!; at Taunglin and Chanchukang, *Ridley* 4422!, 5060!.

The description of the old fruit is taken from *Ridley* 4422, a specimen which probably neither King nor Warbug had seen when they wrote their monographs.

9. HORSFIELDIA AMYGDALINA, Warb. Monog. Myrist. 310 (1897). A glabrous tree; branchlets terete, nearly glabrous, with white lenticels usually conspicuous. *Leaves* pergamaceous; elliptic-oblong, acute, scarcely acuminate, at both ends; blackish-brown above when dry, reddish-brown beneath; 12—18 cm. long, 3—7 cm. broad; main nerves 8—12 pairs, hardly conspicuous, somewhat parallel and curved near the margin, impressed above; transverse nervules and reticulation obscure; petiole about 12 mm. long, channelled. *Flowers*: ♂ in loose branching panicles from the axils of the leaves or of fallen leaves, 8—10 cm. long; rhachis fulvous-puberulous; bracts lanceolate, acute, early caducous; perianth in bud globose, 1—1.5 mm. in diam., 2—3-lobed; andrœcium 1 mm. long, globose, sessile; anthers 12—15, erect, incurved at the apex; ♀ not known. *Fruit* on thick peduncles, 3—4 cm. long, 2—3 cm. broad; pericarp thick, fleshy, the valves subacute when dry. *Seed* ovate, smooth, shining; the arillus complete or more or less distinctly and very shortly lacinate at the apex; albumen ruminate. *Myristica amygdalina*, Wall. Cat. 6797 (1828) and Pl. As. Rar. I. 79, t. 90; A. DC. in Prodr. xiv. 1. 203; Hook. f. and Th. Fl. Ind. 160 (excl. syn. *exaltata*, Wall.); Hook. f. Fl. Br. Ind. V. 106, (excl. syn. *exaltata*, Wall.); Kurz For. Fl. Burma II. 283; King Ann. Calc. III. 300, t. 125 *in part*. *M. floribunda*, Wall. Cat. 6805. *M. integra*, Wall. Cat. 6799. *M. glabra*, Hook. f. and Th. l.c. 161 *in part*; A. DC. l.c. 202 *in part*; Hook. f. l.c. *in part*; King l.c. 310, t. 142. *M. sucosa*, King t. 172, figs. 2, 5, 6, 7.

PENANG: *Curtis*. SINGAPORE: *Murton* 76!.—DISTRIB. Sylhet, Burma, Andamans.

There are no specimens in Hb. Calc. and *Murton*'s is apparently the only one at Kew, the description has, therefore, been adapted from that of *Warburg*.

10. *HORSFIELDIA MAJUSCULA*, Warb. Monog. Myrist. 315 (1897). A tree, reaching 12—21 m. in height and 30—50 cm. in diam. of stem; branchlets stout, greyish-brown, rough, warted, glabrous except the rufous-puberulous extremities and lanceolate leaf-buds. *Leaves* coriaceous, glabrous; elliptic or elliptic-obovate, acute or shortly acuminate at apex, cuneate at base; upper surface pale, greenish-brown when dry, dull, lower bright reddish-brown; margins revolute; 18—25 cm. long, 4—8 cm. broad; midrib stout, usually slightly keeled above, prominent and often rufous-puberulous beneath; main nerves 10—15 pairs, spreading, raised and keeled above, raised beneath, interarching within the margin at about 5 mm. from it; transverse nervules few, obscure on the upper, faint on the lower surface; petiole stout, 12—18 mm. long, channelled above. *Flowers*: ♂ in lax much branched panicles up to 8 cm. long and 6 cm. broad from the axils of fallen leaves, wide at the base and narrowing upwards, the main rachis stout, angular, scurfy; branches ending in few-flowered cymes; pedicels short; buds globose, 1—2 mm. in diam.; perianth thick, leathery, rugose, glabrous, with 3—4 triangular teeth; androecium nearly sessile, trigonous, depressed; anthers about 10—13, narrow, attached at the sides, free at the apex: ♀ in shorter, less branched stouter panicles; perianth ovoid, 2 mm. in diam., rough; ovary subglobose; stigma conical. *Fruit* yellowish-red, on the branches below the leaves, in pairs or solitary, broadly ovoid, obtuse but slightly pointed when young, glabrous, 4.5 cm. long, 4 cm. in diam.; pericarp thickly leathery. *Seed* ovoid, faintly reticulate, smooth; arillus fleshy, entire, covering the whole seed and overlapping at the apex. *Myristica majuscula*, King Ann. Calc. III. 310, t. 143 (1891).

PERAK: at elevations up to 600 m. alt., *King's Collector* 5059!, 6004!, 7965!; at Taipeng, *Wray* 122!, 2705!, at Waterfall Hill, *Wray* 2064!, 2218!; *Scortechini* 837!. SINGAPORE: at Bajan, Bukit Timah, &c., *Ridley* 4439!, 5971!, 6448!, 6449!, 6451!.

11. *HORSFIELDIA IRYA*, Warb. Monog. Myrist. 371, t. xxii (1897). A large tree, reaching 12—18 m. in height; branches spreading; branchlets stout, greyish-brown, lenticellate, with prominent

pairs of raised ridges joining the bases of the leaf-scars, the uppermost dark brown, glabrous; leaf-buds linear-lanceolate. *Leaves* membranous, glabrous; oblong-lanceolate, acuminate at apex, cuneate at base; upper surface dull greenish-brown when dry, lower paler not greenish; 14—20 cm. long, 4—6 cm. broad; midrib rather prominent; main nerves 10—20 pairs, slender, at first straight, curved near the margin and sometimes looped; transverse nervules few, obscure as is reticulation; petiole about 1 cm. long. *Flowers*: ♂ minute, yellow, in axillary glabrous or minutely rufous-pubescent scurfy, many-flowered panicles 6—10 cm. long; branches slender, ending in glomerulate clusters of flowers; bracts oblong, scurfy, dotted, 1—2 mm. long, early caducous; pedicels slender, 1—2 mm. long; buds globose, 1 mm. in diam.; perianth very thin, bivalved; andrœcium broadly obovate, flat-topped, slightly elongate transversely; anthers about 6—10, free except at base, incurved at the apices: ♀ in smaller panicles than the ♂, 4—5 cm. long, the flowers fewer and larger; perianth obovoid, bivalved, thick; ovary glabrous, sessile, globular; stigma small, subterminal. *Fruit* solitary or in scanty racemes, globose, about 2 cm. in diam., glabrous; pericarp yellow, thick, coriaceous. *Seed* spherical; arillus red, thin, fleshy, completely enveloping the seed, entire or slightly cleft at the very apex, the lobes overlapping. *Myristica Irya*, Gaertn. Fruct. I. 195, t. 41 (1788); Poiv. Encyc. Meth. Dict. xii. 36; Lam. Ill. t. 833, 3; Hook. f. and Th. Fl. Ind. 159; A. DC. in Prodr. xiv. i. 202 (excl. syn. *M. exaltata*, Wall.); Miq. Fl. Ind. Bat. I. 2. 64; Bedd. Forest Man. 176; Kurz For. Fl. II. 282; de Vriese Pl. Reinw. 95; Thwaites Enum. Pl. Ceyl. 11; Trimen Fl. Ceyl. II. 435; Hook. f. Fl. Br. Ind. V. 109 (excl. syn. *M. exaltata*, Wall.); King Ann. Calc. III. 309, tt. 141, 141 bis; Brandis Ind. Trees 525; Koord. and Val. Bijdr. IV. 184. *M. javanica*, Blume Bijdr. 576 and in Rumphia I. 190, t. 62. *M. sphærocarpa*, Wall. Pl. As. Rar. I. 79, t. 89; Wall. Cat. 6796. *M. exaltata*, Wall. Cat. 6804 in part. *M. micrantha*, Wall. Cat. 6807. *M. Vriesiana*, Miq. Ann. Mus. Bot. Lugd.-Bat. II. 49.

PENANG: at Pulau Boetong, *Curtis* 936!. MALACCA: *Griffith*, K.D. 4357!; *Maingay* K.D. 1291!, 1292!. PERAK: at Krian, etc., *Scortechini* 1738!; *King's Collector* 7447!; at Bruas Dindings, *Ridley* 7206!. DINDINGS: at Pulau Sembilan, *Ridley* 3043!. JOHORE: at Sungei Panh, *Ridley* 11328!. SINGAPORE: on Pulau Buru, *Ridley* 1701!; Changi, *Ridley* 4814!; in garden jungle, *Ridley* 8857!.—DISTRIB. Java, Sumatra (*Forbes* 3197!), Ceylon, Burma, Andamans, Borneo.

12. *HORSFIELDIA SUCOSA*, Warb. Monog. Myrist. 322 (1897). A large tree, reaching a height of from 18 to 30 m. and a diam. up to nearly 1 m.; branches spreading; branchlets stout with rather rough greyish-brown bark, the uppermost together with the lanceolate leaf-buds and the surfaces of the youngest leaves covered with minute deciduous scurfy tomentum. *Leaves* coriaceous; oblanceolate or obovate-lanceolate, acute or acuminate at apex, much narrowed at the base from the middle downwards; both surfaces glabrous, dull, the lower paler than the upper when dry; margins revolute; 12—25 cm. long, 5—7 cm. broad; midrib conspicuous, especially beneath; main nerves 9—14 pairs, inconspicuous and slightly impressed on the upper, prominent and minutely winged on the lower surface; reticulation obscure; petiole 1—2 cm. long, bordered by the decurrent margins of the blade. *Flowers*: ♂ numerous in branching panicles from the branchlets below the leaves, 8—13 cm. long, the rhachises zigzag, angular, the branches scurfy, ending in subumbellate cymules; pedicels slender 3—5 mm. long; perianth thin, globular, 2—3 mm. in diam., puberulous without, glabrous within with vertical nerves, teeth 2—3, triangular, short; andrœcium sessile, subglobular; anthers about 10, connate at the sides, the apices free, incurved: ♀ in axillary stout, rigid, spreading, rusty-puberulous panicles 3—4 cm. long and about 3 cm. broad; perianth ovoid-globose, glabrous, fleshy, with 3 short triangular teeth; ovary sessile, ovoid-globose, glabrous; stigma sessile, grooved, prolonged on one side. *Fruit* solitary or 2—3 in a raceme, when ripe ovoid or pyriform, very succulent, glabrous, 6—7.5 cm. long, 4—5 cm. in diam.; peduncle woody, about 4 cm. long; pericarp 12—13 mm. thick. *Seed* ovoid, about 3—4 cm. long; arillus fleshy, yellow, enveloping the whole of the seed, slightly lacinate and conduplicate at the apex, otherwise entire. *Myristica sucosa*, King Ann. Calc. III. 301, t. 172 (1891) *in part* (figs. 1, 3, 8, 9).

PROVINCE WELLESLEY: at Krian, *Ridley* 9461!. PERAK: at Gunong Batu Pateh lower camp at about 1000 m. alt., *Wray* 467!; in forest to about 300 m. alt. near Larut Goping and Ulu Bubong, *King's Collector* 4078!, 4647!, 10475!. MALACCA: *Maingay* K.D. 1300!. SINGAPORE: *Ridley* 6559!, 11355!.

13. *HORSFIELDIA CRASSIFOLIA*, Warb. Monog. Myrist. 323 (1897). A tree reaching a height of 18 to 24 m. and 45—60 cm. in diam. of stem; branchlets robust, rough, dark-brown, lenticellate, uppermost puberulous as are the linear-lanceolate leaf-buds. *Leaves* coriaceous, glabrous when old, rufous-tomentose beneath when young; elliptic-

oblong, rather wider in the lower half, obtuse at apex, slightly and suddenly cuneate at base, otherwise rounded; upper surface dull, greenish when dry, with scattered shallow pits, lower reddish-brown, dull, subglaucous; margin slightly revolute; 16—22 cm. long, 7—9 cm. broad; midrib stout, channelled and keeled above, prominent and rough beneath; main nerves 12—15 pairs, impressed above when dry, rather prominent beneath, at first straight and parallel, curving and interarching near the margin; reticulation very obscure; petiole very stout, 2 cm. long. *Flowers*: ♂ in spreading rufous-tomentose panicles 6—12 cm. long, 5—7 cm. broad, from the axils of the leaves or of fallen leaves; branches many, ending in many-flowered rather dense clusters; bracts ovate or obovate, scurfy, 2—3 mm. long, caducous, but a few persisting till the flower opens; pedicels 1—1.5 mm. long; buds globose, 1—1.5 mm. in diam.; perianth bivalved, the valves thin, rugose outside; andrœcium sessile, flattened, elongated transversely; anthers 6—10, partially attached to the column but easily separable, slightly incurved at tip: ♀ in stout scurfy panicles up to 8 cm. long, 5 cm. broad, the pedicels very thick 2.5 mm. long; buds globose, 3—3.5 mm. in diam., vertically furrowed; perianth bivalved, very thick; ovary depressed globose, with sessile bilobed stigma. *Fruit* yellow, in panicles 5—7 cm. long of about 4—6, 2 cm. long, 1.5 cm. diam., ovoid, the rhachis and peduncles very thick, angular, rugose, the perianth-lobes persistent, reflexed; pericarp thick, minutely rugose when dry, splitting down one side. *Seed* ovoid, smooth; arillus thin, fleshy, covering nearly the whole seed, lacinate only at the apex. *Myristica crassifolia*, Hook. f. and Th. Fl. Ind. 160 (1855); A. DC. Prodr. xiv. i. 204; Miq. Fl. Ind. Bat. I. 2. 68; Hook. f. Fl. Br. Ind. V. 108; King Ann. Calc. III. 308, t. 140, t. 172, fig 4. *M. Irya* var. *crassifolia*, Miq. in Herb. *M. Horsfieldii*, Blume?, Wall. Cat. 6806 (in part).

PERAK: in dense forest on low wet ground up to 300 m. alt., *King's Collector* 6688!. MALACCA: *Griffith* K.D. 4350!; *Cantley*; at Sungei Hudang, *Derry* 1163!. SINGAPORE: *Wallich* 6806 *in part*; *T. Anderson* 9!; at Chanchukang, Bukit Mandai, and Bukit Timah, *Ridley* 361!, 1819!, 1828!, 3831!, 4132!, 5826!, 6909!, 8040!, 10695!. —DISTRIB. Bangka, Borneo, Amboina (*De Vriese* 22!).

The ♀ flowers have been described from *Ridley's* No. 10695, the fruit from *Kunstler's* 6688 and *Ridley's* specimens, the identification of which there seems no reason to doubt. I have not quoted *King's Collector* 10413 and some others admitted by *Warburg* as I think they belong probably to *H. sucosa*.

14. HORSFIELDIA BRACHIATA, Warb. Monog. Myrist. 325 (1897).

A tree reaching 20—30 m. in height; branches spreading, pendulous; branchlets stout, glabrous, brown, lenticellate, with prominent pairs of raised ridges joining the bases of the leaves or leaf-scars, innovations and lanceolate leaf-buds rusty-pubescent. *Leaves* chartaceous, glabrous; oblong-lanceolate or -elliptic, acuminate, sometimes abruptly, at apex, acute or rounded or even sometimes subcordate at base; both surfaces dull, the upper olivaceous, the lower reddish-brown when dry; 18—25 cm. long, 6—10 cm. broad; midrib moderately stout, flattened and slightly keeled above, prominent and scurfy-puberulous beneath; main nerves 15—20 pairs, raised on both surfaces, spreading and joining in loops near the margin; transverse nervules distant, arched, visible on lower surface only; petiole 6—8 mm. long, thick. *Flowers*: ♂ in slender, much-branched, spreading, many-flowered panicles from the axils of the leaves or of fallen leaves, 10—15 cm. long and about as much broad; rhachis rusty-puberulous to glabrescent; branches ending in subumbellate cymules; pedicels about 1.5—2 mm. long; perianth leathery, 1—1.5 mm. in diam., teeth 3, triangular; andrœcium subsessile, sharply trigonous; anthers about 9, slightly attached at the sides, the apices free: ♀ in spreading panicles 10—15 cm. long, rhachis rather thicker than in ♂, rusty-puberulous; branches at right angles bearing subumbellate cymes at the ends; pedicels thick, 2 mm. long; perianth leathery, 3 mm. in diam., teeth 3; ovary sessile, ovoid, ridged on one side; stigma short, oblique, 2-lobed. *Fruits* 6—8 together in woody spreading cymes from below the leaves, ovoid, 3 cm. long about 2 cm. in diam.; pericarp rather thin, glabrous. *Seed* ovoid, smooth; arillus covering the whole of the seed, slightly laciniate and overlapping at the apex. *Myristica brachiata*, King Ann. Calc. 311, t. 144 (1891). *M. Horsfieldia*, Wall. (non Bl.) Cat. 6806 in part. *M. polyspherula*, Hook. f. Fl. Br. Ind. v. 108 in part.

PERAK: in dense forest on low wet ground, *King's Collector* 4704!, 6771!; *Scortechini* 1649!. MALACCA: Griffith K.D. 4351!. SINGAPORE: *Ridley* 4439!.

15. HORSFIELDIA LEMANNIANA, Warb. Monog. Myrist. 326 (1897). A tree reaching 12—20 m. in height and 30—37 cm. in diam. of stem; branchlets dark brown, somewhat rough, the younger rusty-puberulous and scurfy, ultimately glabrous and striate. *Leaves* chartaceous, fragile when dry; oblong or oblong-lanceolate, acuminate at apex, cuneate to slightly rounded at base; upper surface pale greenish-brown when dry, glabrous, shining, lower surface dark

brown, dull, glabrous except the midrib; margin slightly revolute; 10—17 cm. long, 4—6 cm. broad; midrib slender, keeled above, scurfy-puberulous beneath; main nerves 10—15 pairs, thin but sharp and bold on both surfaces, subparallel, gently curving to near the margin and there joining in arches at 2—3 mm. from the edge; transverse nervules and reticulation obscure; petiole 8—12 mm. long, channelled. *Flowers*: ♂ in much-branched, spreading, rusty tomentose panicles from the axils of leaves and of fallen leaves 5—12 cm. long, 3—7 cm. broad; rhachis rusty-puberulous; branches ending in subumbellate cymules; bracts lanceolate, densely rusty-tomentose, quickly deciduous; pedicels about 1.5 mm. long; perianth globose, glabrous, black when dry, 1 mm. in diam., teeth 3, triangular; androecium sessile, 3-angled; anthers 9—12, ovate, free at the margins; ♀ in stout few-flowered rusty-pubescent panicles, 4 cm. in diam.; ovary sessile, ovoid, glabrous; stigma sub-bilobed. *Fruit* in short racemes of 2—3, pedunculate, ovoid, narrowly ridged on one side, glabrous, 2 cm. long, 1—5 cm. in diam.; pericarp coriaceous. *Seed* ovoid, smooth, shining; arillus completely covering it. *Myristica Lemniana*, A. DC. in Ann. Sc. IV. 31, t. 4, and Prodr. xiv. 203; Miq. Fl. Ind. Bat. I. 2. 66. *M. globularia*, Hook. f. and Th. Fl. Ind. 180; A. DC. Prodr. xiv. i. 202 *in part.* *M. polyspherula*, Hook. f. Fl. Br. Ind. v. 108; King Ann. Calc. 312, t. 146.

PERAK: in dense forest at 150—300 m. alt., Ulu Bubong, etc., *King's Collector* 3309!, 5536!, 7526!, 10256!, 10431!, 10513!; at Goping, *Scortechini* 211!; at Thaiping, *Wray* 2088!. MALACCA, *Griffith* K.D. 435±!; *Maingay* K.D. 1286!; at Bukit Panchur and Merliman, *Derry* 1136! and 1216!. SINGAPORE: at Jurong, Chanchukang, and Bukit Timah, etc., *Ridley* 2042!, 2108!, 4438! 8930!; at Bukit Timah, *Hullett* 209!.

16. HORSFIELDIA SUBGLOBOSA, Warb. Monog. Myrist. 328, t. xxi. (1897). A tree reaching 12—24 m. in height; branches spreading; branchlets brown, striate, rusty-pubescent and scurfy when young, glabrous when old, faintly 2-ridged between the leaves or leaf-scars. *Leaves* stiffly chartaceous, fragile when dry; elliptic-oblong, acuminate at apex, cuneate or sometimes rounded at base; upper surface glabrous, pale, olivaceous-brown when dry, lower surface reddish-brown except the deciduously pubescent midrib; margins recurved; 15—26 cm. long, 5—7 cm. broad, broadest in the middle; midrib slender, keeled on the upper surface; main nerves 13—17 pairs, subparallel, raised on both surfaces, nearly straight to join in arches at

about 4 mm. from the edge; transverse nervules and reticulation obscure; petiole stout, 8—12 mm. long, bordered by the decurrent margins of the blade. *Flowers*: ♂ in axillary, lax, spreading panicles 4—8 cm. long; rhachis slightly scurfy-pubescent especially when young; pedicels 1—1.5 mm. long, glabrous; perianth globose, glabrous, scarcely 1 mm. in diam. with 3 acute triangular teeth; androecium transversely ovoid, compressed or 3-angled, anthers about 10 attached only by their bases, the margins free: ♀ in shorter panicles. 2—3 cm. long, subglabrous, sparingly branched; pedicels thick; perianth subglobose, 1—1.5 mm. in diam., shortly 3-toothed; ovary depressed-globular, glabrous, with small oblique stigma. *Fruit* solitary or in racemes of 2 or 3, ovoid-globose, glabrous; 3.5—4 cm. long, 2.5—3 cm. in diam.; pericarp yellowish red, thickly coriaceous. *Seed* globose, smooth; arillus rather thick, entire, covering the testa completely. *Myristica subglobosa*, Miq. Fl. Ind. Bat. Suppl. 383; Ann. II. 49. *M. globularia*, Bl. and *subglobosa*, Miq. in Ann. I. 206. *M. glabra*, Miq. Fl. Ind. Bat. I. 2. 65 *in part.* *M. glabra*, Miq. var. *sumatrana* in Ann. II. 49. *M. Collettiana*, King Ann. Calc. III. 313, t. 147.

PERAK: in forests up to 450 m. alt., *King's Collector* 3620!, 3899!, 6566!., 6672!, 6737!. JOHORE: Road to Gunong Palai, *Ridley* 12155!.—DISTRIB. Sumatra.

17. *HORSFIELDIA RIDLEYANA*, Warb. Monog. Myrist. 231 (1897). A tree, reaching 12—18 m. in height and up to 30 cm. or more in diam. of stem; glabrous except the panicle and leaf-buds, branchlets slender, dark brown, with very faint pairs of ridges from the bases of the leaf-scars; innovations rusty-puberulous. *Leaves* chartaceous; lanceolate, acuminate at apex, cuneate at base; upper surface greenish when dry, lower bright brown; 7—13 cm. long, 2.5—4.5 cm. broad; midrib slender, slightly impressed above; main nerves 7—10 pairs, inconspicuous, spreading; petiole 1—1.5 cm. long, channelled above. *Flowers*: ♂ in spreading scurfy or almost glabrous panicles from the axils of leaves or of fallen leaves, up to 6 cm. long; rhachis angular; branches short, ending in subumbellate cymes; pedicels 1.5—2 mm. long, slender; perianth thick, globose, 1—1.5 mm. in diam., teeth 3—4, triangular, acute; androecium sessile, trigonous, with 7—10 suberect anthers attached at their bases, free at their margins and apices: ♀ in short racemes, 1.5—2 cm. long; perianth thick, globose, 1.5—2 mm. in diam., the teeth short; ovary sessile, glabrous, grooved, with an oblique grooved stigma. *Fruit* (young) solitary or

in short racemes of 2—4, ellipsoid. 1—2 cm. long, 10—15 mm. in diam.; pedicel 5 mm. long, stout; pericarp thick, glabrous, leathery. *Seed* oval, smooth; arillus thin, quite entire and completely covering the seed. *Myristica Ridleyana*, King Ann. Calc. III. 311, t. 145 (1891).

PERAK: at elevations from 180—240 m. alt., *King's Collector* 10917!; at Haram, *Scortechini* 862!. SUNGAI UJONG: *Cantley* 1798.

HORSFIELDIA SYLVESTRIS, Warb. Monog. Myrist. 337, t. xii (1897). *Myristica sylvestris*, A. DC. Prodr. xiv. 1. 193; Miq. Fl. Ind. Bat. I. 2. 61. *M. pendulina*, Hook. f. in Fl. Br. Ind. V. 859; King Ann. Calc. 329, t. 170 is represented in the Kew and Calcutta Herbaria by specimens collected in Singapore by *Ridley* (No. 186) and *Cantley*. The former is labelled 'from the Gardens' and it seems very probable that *Cantley's* specimen (also ♀) is similarly from a cultivated tree. Warburg believes that it is only a cultivated plant in Singapore as it also is in Java. I, therefore, content myself with this note and do not give a description.

18. HORSFIELDIA RACEMOSA, Warb. Monog. Myrist. 347 (1897). A tree, 9—12 m. in height; young branches thin, glabrous, dark-coloured, older ones striate, polished. *Leaves* thinly coriaceous; elliptic to elliptic-oblong, subacute or shortly and abruptly acuminate at apex, rounded or subcuneate at base; glabrous on both surfaces, the upper shining, the lower dull and paler; 15—25 cm. long, 5—8 cm. broad; main nerves 12—16 pairs, slightly prominent on the upper, very prominent on the lower, surface, straight and faintly inter-arching near the margin; transverse nervules and reticulation only slightly visible on the lower surface; petiole about 1.5 cm. long, channelled. *Flowers* not known. *Fruit* in lax glabrous racemes, 25—40 cm. in length, ovoid, slightly oblique, pointed, about 5 cm. long, 3 cm. broad; pericarp thickly leathery, glabrous. *Seed* smooth, ovoid, pointed; arillus fleshy, red, completely enveloping the testa, shortly fimbriate at the apex. *Myristica racemosa*, King in Calc. Ann. 328, t. 173.

PENANG: pass to Ralan, *Curtis* 934!. SINGAPORE: Bukit Timah, *Ridley* 6355!.

Warburg thinks that this species is most probably referable to either *H. Prainii* of the Andaman Islands or *H. canarioides*, and I cannot help thinking he is right, especially in regard to the latter-mentioned.

2. GYMNACRANTHERA, Warb.

Diœcious trees with evergreen pergamaceous glabrous *leaves*, reddish-white beneath, the main nerves confluent near the margin,

the transverse nervules obscure. *Inflorescence* of axillary panicles, the flowers fasciculate; bracts at the bases of the pedicels caducous; flowers small, urceolate, pedicellate; bracteoles 0; perianth 3—4-toothed. *Andrœcium* sessile; filaments combined in an oblong thick column; anthers 6—12, elongate, the lower parts adnate to the column by their backs, the apices free, often inflexed and covering almost the whole column. *Stigmas* sessile, connate, scarcely bilobed. *Fruit* globose or ovoid; pericarp thick, fleshy; arillus laciniate almost to the base. *Seed* conform to the fruit; testa woody; albumen ruminant; cotyledons divaricate, connate at the base.—**DISTRIB.** S. Asia from India to the Philippines and New Guinea, species 11.

♂ flowers 4 mm. long, thickly rusty-tomentose, as is the undersurface of the leaves when young; leaves 20—35 cm. long. 1. G. MURTONI.

♂ flowers at most 3 mm. long, almost glabrous; the undersurface of fully-developed leaves glabrous.

Main nerves of the leaves strongly prominent beneath; leaves usually longer than 15 cm. 2. G. FORBESII.

Main nerves of the leaves only slightly prominent beneath; leaves usually under 15 cm. 3. G. FARQUHARIANA.

1. GYMNACRANTHERA MURTONI, Warb. Monog. Myrist. 357, t. xx. (1897). A tree reaching 25 m. in height; branchlets stout, densely covered with very short rufous tomentum beneath which they are minutely lenticellate and striate; leaf-buds densely rufous-tomentose. *Leaves* coriaceous; elliptic-ovate, shortly and abruptly acuminate at apex, broadly rounded and often emarginate at base; upper surface glabrous, shining, lower covered with deciduous rusty tomentum, finally glabrous and subglaucous; margins slightly revolute; 20—35 cm. long, 7—12 cm. broad; midrib stout, broad above, prominent beneath; main nerves 20—22 pairs, parallel, sub-horizontal, at first straight, curving and inter-arching near the margin; transverse nervules irregular, subparallel; reticulation obscure; petiole 1—2 cm. long, stout, rugose, channelled above. *Flowers*: ♂ in axillary densely silky, rufous-tomentose panicles up to 8 cm. long; branches spreading, many-flowered; buds ovoid, 3—4 mm. long; pedicels very short; perianth leathery with 2 or sometimes 3 teeth, tomentose without, less so within; andrœcium sessile, broadly ovoid, obtuse at apex; anthers about 7—10, narrow, elongate, their apices free and acuminate: ♀ very short, axillary, few-flowered, pedicels short. *Fruit* ovoid, flattened, acute at apex, obtuse at base, densely covered with rufous tomentum, 2.5 cm. long, 1.5 cm.

broad splitting into two valves; pericarp coriaceous, 2 mm. thick. *Seed* (immature) ovoid; arillus longer than the seed and deeply lacinate, thin. *Myristica Murtoni*, Hook. f. Fl. Br. Ind. V. 105; King Ann. Calc. III. 297, t. 124 *ter*. *M. ferruginea*, Wall. Cat. 6803; King l.c. 298, t. 125.

SINGAPORE: *Wallich* 6803!; at Selitar, *Ridley* 1835!, 4815!; at Sungei Morai, *Ridley* 3890!.

2. GYMNACRANTHERA FORBESII, Warb. Monog. Myrist. 363, t. xx. (1897). A tree, reaching 18—24 m. in height and 60—90 cm. in diam. of stem, glabrous except the rufous-tomentose lanceolate leaf-buds and puberulous inflorescence; branchlets slender, pale brown, smooth, with minute lenticels. *Leaves* chartaceous or thinly coriaceous; oblong-lanceolate or -oblanceolate, acuminate at apex, cuneate or somewhat rounded at base; both surfaces when dry somewhat purplish-brown, the upper shining, the lower glaucous; 15—25 cm. long, 5—10 cm. broad; midrib rather stout, impressed above, prominent beneath; main nerves 13—17 pairs, thin but distinct beneath, sub-horizontal to ascending, inter-arching within (5 mm. from) the margin in rather prominent loops; secondary nerves and transverse nervules few; reticulation obscure; petiole about 10—15 mm. long, channelled above. *Flowers*: ♂ in spreading panicles 5—6 cm. long from the axils of the leaves or of fallen leaves; branches short, many-flowered, bearing umbellate cymules, in subglobular clusters; pedicels slender, 2 mm. long; perianth at first ovoid, afterwards urceolate, 3.5—4 mm. long; teeth 3—5, reflexed, nearly as long as the tube, acute: androecium sessile, 2 mm. high, subquadrangular; anthers 6—10, free at the apex and sides, twisted: ♀ in condensed panicles, fewer-flowered than in ♂ and under 2.5 cm. long; perianth scurfy-pubescent within; teeth acute; ovary sessile, ovoid, scurfy-pubescent; stigma oblique. *Fruit* in racemes 3—12, when young subglobular, when ripe narrowly obovoid, grooved, slightly scurfy. 2—2.5 cm. long, 12 mm. in diam.; peduncle rather stout, thickened upwards, 8—10 mm. long; pericarp yellow to red, coriaceous. *Seed* smooth, ellipsoid or slightly obovoid: arillus extending to the apex of the seed, thin, pale, fleshy, divided to the base into many narrow segments. *Myristica Forbesii*, King Ann. Calc. III. 306, t. 137.

PENANG: Government Hill, *Maingay* 1293!. PROVINCE WELLESLEY: at Krian, *Ridley* 9464!. PERAK: common at elevations up to 250 m. alt., *King's Collector* 3783!, 6591!, 6784!, 6973!, 7419!.

7645!, 7732!, 8159!, 8722!, 8756!, 10080!; at Tapa, *Wray* 1429!.
 NEGRI SEMBILAN: at Tampur, *Goodenough* 1845!. MALACCA: *Main-
 gay* K.D. 1295; at Ayer Panas, *Holmberg* 818!; at Kesang Tua and
 Sungei Hudang, *Goodenough* 1317!, 1355!. SINGAPORE: at Selitar,
Ridley 6270!.—DISTRIB. Sumatra (*Forbes* 2976!, 3061!).

3. GYMNACRANTHERA FARQUHARIANA, Warb. Monog. Myrist.
 365, t. xx. (1897). A tree reaching 20—30 m. in height and up to
 about 90 cm. in diam. of stem; branches spreading; branchlets
 slender, at first rusty-puberulous, afterwards paler, often slightly
 lenticellate; leaf-buds linear-lanceolate, about 5 mm. long. *Leaves*
 subcoriaceous, glabrous; lanceolate, oblong-lanceolate or slightly
 oblanceolate, acuminate at apex, cuneate at base; upper surface
 shining, brown when dry, lower pale, purplish-brown, glaucous;
 margins revolute; 7—15 cm. long, 2—4 cm. broad; midrib slender,
 slightly impressed above, prominent and dark beneath; main nerves
 6—10 pairs, usually indistinct, only slightly inter-arching; reticula-
 tion obscure; petiole about 1 cm. long, channelled above. *Flowers*:
 ♂ in spreading rusty-puberulous panicles 2.5—4 cm. long and 2.5
 cm. broad from the axils of the leaves or of fallen leaves; pedicels
 1.5—2 mm. long, puberulous; cymules umbellate, 6—10-flowered;
 perianth ovoid, inflated, 2.5—3.5 mm. long, puberulous outside and
 inside, the inside also with numerous vertical lines; teeth 3 or 4,
 triangular, acute, nearly half the length of the perianth; andrœcium
 cylindric, sessile, 1.5—2 mm. long; anthers 7—8, narrow, elongate,
 the apices and edges free: ♀ in few-flowered short panicles, 2—2.5
 cm. long, from the axils of fallen leaves; pedicels short; perianth
 deeply 3—4-cleft, 2—2.5 mm. long, the lobes acute, their tips reflexed;
 ovary sessile, ovoid-globose, tomentose; stigma sessile, transversely
 2-lobed. *Fruit* in woody racemes of 2—5, ovoid, slightly pointed at
 each end, faintly grooved on one side and ridged on the other, 1.5—
 2 cm. long, 1—1.5 cm. in diam., rufous-pubescent, becoming glabrous
 with age; peduncle 8—12 mm. long, stout; pericarp thick. *Seed*
 ellipsoid, mottled, smooth; arillus thin, extending to the apex of the
 seed, narrowly laciniate. *Myristica Farquhariana*, Wall. Cat. 6795;
 A. DC. Prodr. xiv.; 200; Miq. Fl. Ind. Bat. I. 2. 63; Hook. f. &
 Th. Fl. Ind. 161; Hook. f. Fl. Br. Ind. V. 108 (*all in part, Malay
 Peninsula material only*); King Ann. Calc. III. 305, t. 136. *M.
 eugeniaefolia*. A. DC. l.c. 190; Miq. l.c. 58; Hook. f. l.c. 113; King
 l.c. 330.

PENANG: *Curtis* 487, 804!, etc. PERAK: *Scortechini*!; at Tapa

and Waterfall Hill, *Wray* 1436!, 2034!: in hilly forests up to 900 m. alt., *King's Collector* 3833!, 4640!, 5408!, 5801!, 6141!, 6620!, 6631!, 6652!, 6932!, 7481!. SELANGOR: Batu Tiga, *Curtis* 3768!. MALACCA: *Maingay* K.D. 1290, 1293, 1302!, 1303!, 1306!; *Hervey*!. JOHORE: at Bukit Patani, *Ridley* 11029!. SINGAPORE: *Wallich* 6795!; *Cantley* 41; *Ridley* 2102!.

Var. major, *King*. Young branches rather darker than in the typical form; leaves 12—18 cm. long, larger than in the typical form and more glaucous beneath, the nerves more distinct on the lower surface; panicles of ♂ flowers rather long (6—8 cm.), the flowers larger (3.5—4 mm.); fruit larger, 2.5 cm. long, scarcely ridged on the side opposite the groove.

PERAK: in hill forests, *King's Collector* 6548!, 6622!, 6736!, 7928!; at Thaipeng, *Wray* 2399!, 2695!. MALACCA: *Griffith* K.D. 4355!. SINGAPORE: *Ridley* 102!, 3961!.

Var. *Griffithii*, *Warburg*. Leaves with more distinct nerves which are more oblique and interarch more conspicuously; male inflorescence less branching, nearly glabrous, the perianth scarcely half as big as in the type, 1.5—2 mm. in diam., glabrous within, androecium smaller, ovoid-globular. *Myristica Griffithii*, *Hook. f. Fl. Br. Ind. V. 109*; *King Ann. Calc. III. 305, t. 135*.

PENANG: at Moniot's Road, etc., at 450 m. alt., *Curtis* 2406!, 2458!. MALACCA: *Griffith* K.D. 4356!.

3. MYRISTICA, Linn.

Dioecious trees with chartaceous or pergamaceous leaves, usually white or glaucescent beneath and often with a ferruginous tomentum; main nerves confluent near the margin; transverse nervules often subparallel, scarcely distinct. Inflorescence of cymes, umbels or few-flowered panicles, axillary or from the axils of fallen leaves; bracts caducous; flowers rather large, urceolate or campanulate rarely tubular, pedicellate; bracteoles persistent, usually oblique, at the base of the perianth; perianth 3-toothed. Androecium stalked; filaments connate in a column often produced beyond the anthers; anthers 12—30, elongate, connate to the column and to each other. Stigmas connate, bilobed. Fruit large, ovoid or oblong; pericarp thick, succulent, rarely leathery; arillus laciniate almost to the base. Seed conform to the fruit; testa hard; albumen ruminant; cotyledons connate.—DISTRIB. South Asia from India to the Philippines, Polynesia and tropical Australia; species about 80.

Inflorescence branching, the ultimate branches bearing at least 3 flowers; leaves, at least when mature, glabrous beneath.

♂ perianth broadly ovoid or almost globose, 5—8 mm. long; ♂ inflorescence much longer than the petiole; fruit very large (8—12 cm. long, 3·5—4·5 cm. broad) 1. *M. MAXIMA.*

♂ perianth ovoid or ellipsoid.

Bracteoles of ♂ flowers large.

Bracteoles broad, 4 mm. long; top of andrœcium free, glabrous; ♂ flowers 5 mm. long, 4 mm. broad; leaves lanceolate, 16—29 cm. long 2. *M. MAINGAYI.*

Bracteoles narrow, 2 mm. long; top of andrœcium covered by the anthers; ♂ flowers 3—4 mm. long, 1·5—2 mm. broad; leaves linear or lanceolate, 8—11 cm. long .. 3. *M. GIGANTEA.*

Bracteoles of ♂ flowers small, rarely over 1 mm. long.

♂ flowers 3—4 mm. long; leaves oblong-lanceolate or -oblanceolate under 18 cm. long, 4 cm. broad 4. *M. INERS.*

♂ flowers 2—2·5 mm. long; leaves oblong over 15 cm. long, 4 cm. broad .. 5. *M. MALACCENSIS.*

Inflorescence not branching or forked; leaves, when mature, glabrous beneath, sometimes a slight pubescence remaining.

Leaves beneath only slightly lighter in colour than above, not glaucous.

Flowers narrowly urceolate, oblique, 8 mm. long, 4 mm. broad; bracteole on the pedicel 0·5 mm. below the perianth 6. *M. ELLIPTICA.*

Flowers urceolate, not oblique; bracteole at the base of the perianth 7. *M. SUAVIS.*

Flowers long elliptic, 5 mm. long, 2—3 mm. broad; bracteole at the base of the perianth 8. *M. CINNAMOMEA.*

Leaves beneath light coloured, mostly glaucous.

Peduncle of ♂ inflorescence slender, not woody, a ways under 3, mostly under 2 mm. thick.

♂ Perianth ovoid, rarely linear, 4—7 mm. long 9. *M. FRAGRANS.*

Peduncle of ♂ inflorescence very thick, usually woody; leaves on an average longer than 20 cm.

Anthers 14—18; ♂ inflorescence up to 9 mm. long; fruit with close weak felt .. 10. *M. CRASSA*

Anthers 10—14; ♂ inflorescence 3 mm. long; fruit thickly woolly 11. *M. LOWIANA.*

1. *MYRISTICA MAXIMA*, Warb. Monog. Myrist. 385 (1897). A tree reaching 24—30 m. in height and 90—120 cm. in diam. of stem; branches spreading; branchlets stout, smooth, lenticelled, glabrous; buds lanceolate, tawny. *Leaves* coriaceous; oblong, sometimes slightly obovate, shortly and rather abruptly acuminate at apex, rounded or subtruncate rarely cuneate at base; upper surface glabrous, shining, lower pale, glaucous, minutely adpressed-lepidote when young; margins recurved; 25—40 cm. long, 10—15 cm. broad; midrib very stout; main nerves 20—30 pairs, spreading or subhorizontal, inter-arching within the edge, prominent beneath, scaly when young, but ultimately glabrous; petiole stout, 2—3 cm. long. *Flowers*: ♂ in panicles, axillary or from the axils of fallen leaves, 10—17 cm. long; rhachis flattened, scaly; branches short, bearing subumbellate racemes of 4—6 flowers; pedicels slender, 1—2 cm. long; bracteole semi-annular or suborbicular, embracing half the base of the flower, 2 mm. long; perianth leathery, scaly-tomentose without, glabrous within, urceolate, 6 mm. long, 4 mm. broad, the mouth with 3 broadly triangular subacute teeth; andrœcium cylindrical, 4—5 mm. long, on a short thick stalk 1—2 mm. long, nearly as long as the perianth, the connectives connate in a cone at the apex; anthers 12—20 narrowly elongate: ♀ unknown. *Fruit* ellipsoid or oblong when ripe, blunt at the apex, slightly narrowed at base, minutely rufous-pubescent, sub-furfuraceous, 7—9 cm. long, 4—5 cm. in diam.; pericarp thickly coriaceous. *Seed* shining, conform to the fruit; arillus thin, fleshy, bright red, extending to the apex of the seed, lacinate and areolate. *M. bracteata*, King (*non* DC.) Ann. Clac. III. 286, t. 107.

PENANG: Government Hill 350 m., *Curtis* 1497!. PERAK: at low elevations on the hills near Larut, *King's Collector* 5513!, 6960!; at Larut, *Scortechini* 1872!. SINGAPORE: at Bukit Timah, *Ridley* 3363!—DISTRIB. Borneo (*Beccari* 1556!).

2. *MYRISTICA MAINGAYI*, Hook. f. in Fl. Br. Ind. V. 104 (1886). A tall tree reaching 9—18 m. in height and 45—60 cm. in diam. of stem; bark contracting in longitudinal ridges; branchlets rather stout, at first rusty-tomentose, afterwards glabrous with thin nearly black bark. *Leaves* coriaceous; linear-oblong, acute or acuminate at apex, acute cuneate or rounded at base; upper surface shining, lower dull, both glabrous, pale brown when dry; margins recurved; 13—20 cm. long, 4—5 cm. broad; midrib stout, slightly impressed and keeled above, prominent beneath; main nerves 16—18 pairs, im-

pressed above, slightly prominent beneath, evanescent towards the margin; transverse nervules rather obscure, impressed; petiole 2—2.5 cm. long. *Flowers*: ♂ in drooping, solitary, axillary, 10- to 16-flowered rusty-tomentose umbellate cymes; peduncle 5—6 mm. long; pedicels thick, 3 mm. long; bracteole half-orbicular, up to 5 mm. long, embracing the lower half of the flower on one side; perianth ovate, rusty-tomentose without, granular within, up to 6.5 mm. long, teeth ovate, acute; androecium fusiform, shortly apiculate, 5 mm. long, on a very short rufous-villous column: anthers 7 or 8, linear: ♀ not known. *Fruit* oblong, 7—9 cm. long and 3—4 cm. in diam., blunt, glabrous; peduncle about 2.5 cm. long, stout, woody; pericarp thick, fleshy. *Seed* ellipsoid, smooth, 5 cm. long; arillus fleshy, reaching to the apex of the seed, deeply fimbriate in its upper half. King Ann. Calc. III. 294, t. 114; Warb. Monog. Myrist. 398.

PENANG: at Moniot's road, 450. m. alt., Curtis 2455!. PERAK: *Scortechini*!. MALACCA: *Maingay* K. D. 1289!; at Bukit Jús, *Derry* 1033!.

3. MYRISTICA GIGANTEA, King in Ann. R. Bot. Gard. Calc. III. 288, t. 110 (1891). A large tree reaching 27—40 m. in height and considerable girth; bark black, fissured; branchlets thin, at first rusty-puberulous, afterwards glabrous and dark coloured; leaf-buds lanceolate, rusty-puberulous. *Leaves* coriaceous; narrowly elliptic-oblong or -lanceolate, obtuse or obtusely acute at apex, acute at base; both surfaces glabrous, upper shining, pale when dry, lower dull, pale, subglaucous at first; margins revolute; 7—11 cm. long, 2—3.5 cm. broad; midrib impressed and keeled above, prominent beneath; main nerves 12—18 pairs, subhorizontal, faint, impressed above, interarching close to the edge; reticulation impressed above, obscure beneath; petiole 12—18 mm. long, channelled. *Flowers*: ♂ in rusty-pubescent, cymose, rather stout panicles from the axils of the leaves or of fallen leaves, twice as long as the petioles; perianth 3—4 mm. long, ovoid, with short blunt or subacute teeth, rusty-tomentose without, subglabrous within; pedicel 3—4 mm. long; bracteole narrowly semi-annular, embracing half the base of the perianth, tomentose; androecium half the length of the perianth, cylindric, blunt, the anthers linear, about 10, stalk about one-third of the length of the column, tomentose: ♀ unknown. *Fruit* (immature) 2.5 cm. long, solitary, on a thick woody pedicel 12—25 mm. long, broadly ovoid, slightly pointed, densely rufous-tomentose. *Seed* ovoid, shining; the arillus thin, extending to the apex of the

seed, narrowly fimbriate nearly to the base. Warb. Monog. Myrist. 400.

PERAK: at elevations under 300 m. alt., *Scortechini* 1949!; *King's Collector* 5866!, 6050!.

4. *MYRISTICA INERS*, Bl. Bijdr. 575 (1828). A tree; branchlets slender, dark brown, rough, uppermost subglaucous and slightly puberulous. *Leaves* chartaceous; oblong-lanceolate or oblanceolate, acute or slightly acuminate at apex, attenuate at base; both surfaces glabrous, upper olivaceous when dry, lower reddish-brown; margins slightly recurved; 8—18 cm. long, 3—4 cm. broad; midrib slender, keeled above; main nerves 12—15 pairs, impressed above, oblique, curving to and along the margin but not looped; transverse nervules and reticulation obscure; petiole 1 to 1.5 cm. long, often twisted. *Flowers*: ♂ in short panicles of subumbellate cymules from the axils of the leaves or of fallen leaves, the panicles up to 2—2.5 cm. long; pedicels slender, about 4 mm. long; bracteole ovate, 1.25 mm. long, embracing the base of the perianth; perianth ovoid, 3—4 mm. long, rusty-puberulous without, glabrous within, 3-toothed, the teeth 1—1.5 mm. long; andrœcium 2.5 mm. long, slender, the anthers as long as the stalk, the latter rather slender, puberulous; anthers about 10: ♀ in short axillary panicles about 14 mm. long, puberulous; bracts very short as are the pedicels, bracteoles large, at the base of the perianth; perianth inflated, campanulate, tomentose without, 5 mm. long, 4 mm. broad; ovary ovoid-conic, ferruginous-pubescent; stigma obtuse. *Fruit* very large, oblong, single or in pairs, up to 7 cm. long, 4 cm. thick; peduncles short, thick; pericarp slightly tomentose, soon glabrescent. *Seed* 4—5 cm. long, 2—3 cm. broad; the arillus thick, red, laciniate except near the base. Bl. Rumphia I. 184, t. 58; A. DC. Prodr. xiv. 190 (*excl.* syn. Roxb. and Cum.); Miq. Fl. Ind. Bat. I. 2. 57 (*excl.* as above); Koord. & Val. Bijdr. iv. 175; Warb. Monog. Myrist. 521, t. xvii. *M. sublanco-lata*, Miq. l.c. 58.

PERAK: at lower camp, Gunong Batu Pateh, at about 1000 m. alt., *Wray* 1214!.

5. *MYRISTICA MALACCENSIS*, Hook. f. Fl. Br. Ind. v. 104 (1886). A glabrous tree; branchlets rather slender. *Leaves* oblong or oblong-elliptic, acute or acuminate at apex, usually rounded but sometimes acute at base; 15—25 cm. long, 4—9 cm. broad; midrib stout; main nerves 15—20 pairs, at first nearly straight, finally

interarching near the edge; petiole 1—2 cm. long. *Flowers*: ♂ in solitary panicles from the axils of the leaves or of fallen leaves, 7—10 cm. long, slender; flowers 2·5 mm. long on filiform pedicels 5 mm. long in subumbellate cymes; bracteoles large, reniform, membranous, glabrous with ciliate margins; perianth subglobose, sub-inflated, very coriaceous, glabrous, its apex with 3 broad blunt shallow teeth; andrœcium much shorter than the perianth, broad, subtruncate, almost sessile; anthers about 7, their tips free, sub-acute: ♀ not known. *Fruit* unknown. King Ann. Calc. III. 287, t. 107 bis; Warb. Monog. Myrist. 411.

MALACCA: *Maingay* K.D. 1305.

6. MYRISTICA ELLIPTICA, Wall. Cat. 6798A (1828). A tree reaching 18—24 m. in height and 60—90 cm. in diam. of stem; branches stout, spreading; branchlets rather slender, pale, at first rusty puberulous, afterwards glabrous like all other parts. *Leaves* chartaceous; elliptic or elliptic-oblong to linear-oblong, shortly and rather bluntly acute or acuminate at apex, cuneate and slightly unequal at base; both surfaces pale when dry, upper shining, lower dull, glaucous; margins slightly recurved when dry; 13—20 cm. long, 4—10 cm. broad; midrib stout, prominent beneath; main nerves 8—12 pairs, distant, curving to and along the margin, slender; reticulation not visible; petiole 12—20 mm. long. *Flowers*: ♂ in shortly pedunculate, supra-axillary umbels rather longer than the petioles; peduncles 5—7 mm. long; pedicels 2·5—5 mm. long; bracteole suborbicular; perianth 8—9 mm. long, elongate and narrowly tubular, suburceolate, divided for $\frac{1}{3}$ to $\frac{1}{2}$ its length into 3 narrowly ovate acute teeth with many black glandular dots, puberulous or glabrous without, glabrous within; andrœcium cylindric, bluntly apiculate, nearly as long as the tube, the stalk shorter than the column; anthers about 10: ♀ umbellate like the ♂: perianth distinctly urceolate, the lobes ovate, blunt; ovary sessile, adpressed pubescent, tapering into the oblique lateral stigma; style 0. *Fruit* oblong, long-narrowed at the base, ridged along the suture, slightly gibbous; 7—8 cm. long, 2—3·5 cm. broad, glabrous; pericarp reddish-yellow, thick, succulent. *Seed* cylindric, tapering at the ends; arillus deep red, lacinate at the sides, rather succulent. Hook. f. & Th. Fl. Ind. 162; A. DC. Prodr. xiv. I. 190; Miq. Fl. Ind. Bat. I. 2. 58; Hook. f. Fl. Br. Ind. V. 102; King Ann. Calc. III. 295, t. 113; Warb. Monog. Myrist. 435, t. xvi. *M. calocarpa*, Miq. l.c. 68, Suppl. 383 and Ann. Mus. Lugd.-Bat. II. 48. *M. sycocarpa*, Miq. l.c. 68 and Ann. l.c. 48.

PENANG AND SINGAPORE: *Wallich* and *Porter* 6798A!. PENANG: *Curtis* 1122!. PERAK: in dense forest on low hills, *King's Collector* 3732!, 4276!, 4426!, 4703!, 5198!, 5288!, 8559!, 10321!, 10583!; at Waterfall hill and Tupai, *Wray* 1736!, 2345!; at Goping, *Scortechini* 79!, 1964!. MALACCA: *Maingay* K.D. 1296!. SINGAPORE: by stream, Chanchukang, *Ridley* 331!; at Bukit Timah, *Ridley* 6920!.—DISTRIB. Sumatra, Borneo.

7. *MYRISTICA SUAVIS*, King in Ann. R. Bot. Gard. Calc. III. 295, t. 121 (1891). A tree, all parts glabrous except the minutely pubescent leaf-buds and flowers; branchlets rather stout, cinereous, striate, the tips dark-coloured and smooth. *Leaves* coriaceous; elliptic-lanceolate, acute at each end, the base slightly unequal-sided; upper surface dull, lower pale; margins recurved; 15—23 cm. long, 5—6 cm. broad; midrib stout; main nerves 20—25 pairs, at first straight, parallel, then curving to and along the margin, impressed on the upper, prominent on the lower surface; petiole 2.5 mm. long, stout, channelled above. *Flowers*: ♂ 2—4 together in short thick woody racemes from the axils of the leaves, or close together on the branches below the leaves; pedicels about 2.5 mm. long; bracteole broad, semi-orbicular, embracing the base of the flower on one side; perianth narrowly campanulate, cut half-way down into 3 triangular acute recurved teeth, scurfy-tomentose without, glabrous within; andrœcium cylindric, not apiculate, shortly stalked; anthers about 6, linear, connate: ♀ like the ♂ but with longer stouter pedicels and shorter teeth; ovary narrowly ovoid, minutely tomentose; stigma sessile, divided by a central groove into 2 oblong lobes. *Fruit* unknown, the arillus of the young seed extending to its apex, deeply and narrowly laciniate, Warb. Monog. Myrist. 441.

MALACCA: at Selandor: *J. M. Alwis*!.

8. *MYRISTICA CINNAMOMEA*, King in Ann. R. Bot. Gard. Calc. III. 292, t. 116 (1891). A tree reaching 18 to 24 m. in height and 60 to 120 cm. in diam. of stem; branches spreading; branchlets thin, rather dark, sparingly rufous-puberulous at first, finally glabrous; buds lanceolate. *Leaves* thinly coriaceous; lanceolate or oblong-lanceolate, tapering about equally to either end; upper surface shining, pale brownish-green when dry, lower uniformly covered with a close layer of cinnamomeous minute stellate adpressed hairs; margins recurved when dry; 10—25 cm. long, 3—7 cm. broad; midrib stout, deeply impressed above; main nerves 14—20 pairs, faint on both surfaces, slightly impressed on the upper, ascending;

reticulation not visible; petiole 1—2 cm. long, scurfy-pubescent. *Flowers*: ♂ in rufous-tomentose 8- to 14-flowered axillary umbellate cymes about as long as the petioles; peduncle stout, flattened, 10—12 mm. long; pedicels slender, 5 mm. long; bracteole ovate, acute, obliquely embracing one side of the base of the flower; perianth elongate-ovoid, tubular, 6 mm. long, minutely scurfy-tomentose without, glabrous within, teeth subacute; androecium cylindrical, nearly as long as the perianth, slightly apiculate, on a stalk nearly or quite as long; anthers about 10, linear: ♀ not known. *Fruit* reddish-yellow, ellipsoid, sometimes tapering at the base, the apex sub-obtuse but apiculate, 6—9 cm. long, ridged down the middle, minutely rufous-tomentose; pericarp 9—12 mm. thick, fleshy; peduncle stout, 6—12 mm. long and about 5—7 mm. thick. *Seed* cylindrical-ellipsoid, 5 cm. long; testa thin, shining; arillus thin, extending to the apex of the seed, deeply laciniate at the sides. Warb. Monog. Myrist. 445.

PERAK: at elevations under 450 m. alt., *King's Collector* 1057!, 3554!, 5170!, 5355!, 5458!, 5770, 6696!, 7474!; *Wray* 3026!. SINGAPORE: at Changi, Bukit Mandai and Sumbanang, *Ridley* 3377!, 3581!, 5572!, 6266!.

9. MYRISTICA FRAGRANS, Hoult. Handleid Hist. Nat. Linn. II. 3. 233 (1774). A tree reaching 12—15 m. in height and a considerable girth, glabrous except the ovary and young fruit; bark nearly black; branchlets slender, brownish; leaf-buds linear-lanceolate. *Leaves* thinly coriaceous; elliptic-oblong or lanceolate, shortly acuminate at apex, acute at base; upper surface shining, lower dull subglaucous; 6—13 cm. long, 4—6.5 cm. broad; midrib moderately stout, prominent beneath; main nerves 8—10 pairs, impressed above, prominent beneath, curving to and along the margin; reticulation obscure; petiole 10—15 mm. long, slender. *Flowers*: ♂ in slender supra-axillary umbellate cymes 2—3 cm. long; perianth 5 mm. long, ellipsoid, sub-urceolate with short triangular teeth; bracteole ovate, 1.5 mm. long, deciduous leaving an oblique ring; pedicels slender, 6—12 mm. long; androecium cylindrical, 3 mm. long, on a stalk 1.5 mm. long; stamens 9—12: ♀ larger than the ♂ and in fewer-flowered umbels; perianth 8—10 mm. long, urceolate, the teeth short, reflexed; ovary sessile, cylindrical-ellipsoid, tawny-villous; stigmas 2 flat, broad, fleshy. *Fruit* broadly pyriform, sometimes apiculate, 6—9 cm. long and nearly as broad, glabrous; pericarp yellow, succulent. *Seed* broadly ovoid, areolate, striate, embraced to

the apex by the red, fleshy, much lacinate arillus. A. DC. Prodr. xiv. 1. 189; Bl. Rumph. I. 180, t. 55; Miq. Fl. Ind. Bat. I. 2. 53; Benth. & Trim. Med. Pl. III. t. 218; Baill. Hist. des Pl. II. 498, tt. 298—306; Engl. & Prantl Naturl. Pflanzenfam. III. 2. 41, fig. 35; Hook. f. Fl. Br. Ind. V. 102; King in Ann. Calc. III. 287, t. 108; Koord. & Val. Bijdr. IV. 194; Brandis Ind. Trees, 524. *M. officinalis*, Linn. f. Suppl. 265; Gaertn. Fruct. I. 194, t. 41 (*excl. syn. Rumph.*); Hook. Exot. Bot. t. 155, 156 and Bot. Mag. tt. 2756, 2757; Spach Suites Buff. t. 143; Warb. Monog. Myrist. 458. *M. moschata*, Thunb. in Act. Holm. (1782) 45; Wall. Cat. 6785; Roxb. Fl. Ind. III. 733; Bl. Bijdr. 575. *M. aromatica*, Lamk. in Act. Par. 155 (1788) tt. 5—7 and Ill. Gen. t. 832; Roxb. Cor. Pl. III. 274, t. 267—'Pala' Rumph. Herb. Amb. II. 14, t. IV. The Nutmeg Tree.

Cultivated in the Malay Peninsula. PENANG: *Wallich* 6785 E; *King's Collector* 1677!; *Curtis*!. MALACCA: *Griffith* K. D. 4352!; *Maingay* K. D. 1285!. SINGAPORE: *Cuming* 2418!.—DISTRIB. Indigenous in the Moluccas, cultivated in most tropical regions.

I have thought it right to include the description of the true Nutmeg tree, so universally cultivated in tropical countries.

10. MYRISTICA CRASSA, King in Ann. R. Bot. Gard. Calc. III. 293, t. 117 (1891). A large tree reaching 12 to 18 m. in height and 60—90 cm. in diam. of stem; branches spreading; branchlets rather stout, very dark-coloured, glabrous. *Leaves* coriaceous; oblong, elliptic-oblong or oblanceolate, acute, rarely acuminate at apex, cuneate at base; both surfaces glabrous, the lower pale, subglaucous; margins recurved when dry; 18—40 cm. long, 7—12 cm. broad; midrib prominent, especially beneath; main nerves 15—22 pairs, impressed above, spreading and interarching near the edge; reticulation obscure; petiole 2.5—3.5 cm. long, stout, channelled. *Flowers*: ♂ in many-flowered tomentose sessile umbels from stout woody axillary peduncles about 5 mm. long; pedicels 5—7 mm. long, rather slender; bracteole orbicular-ovate, rugose, closely embracing half the flower on one side; perianth 5 mm. long, minutely rusty-tomentose without, glabrous within, ovoid when young, urceolate and slightly constricted about the middle when adult, the apex acute, 3-cleft to about one-third of its length, the teeth ovate-acute; andrœcium narrowly ovoid, apiculate, 3 mm. long, on a lepidote stalk of 2 mm.; anthers 14—18, linear: ♀ not known. *Fruit* solitary or in clusters of 2—3, pedunculate, ovoid-globose, slightly pointed, the base rounded or subtruncate, minutely rufous-puberulous, 3.5—7.5 cm.

long and half as much in diam.; pericarp yellowish, thick, succulent. Seed ovoid; arillus fleshy, yellow, lacinate, extending to the apex of the seed. Warb. Monog. Myrist. 495.

PERAK: at low elevations under 150 m. near Larut, etc., *King's Collector* 2758!, 4475!, 5065!, 6061!, 7756!, 10038!; Waterfall Hill, *Wray*, 646!. MALACCA: *Cantley* 35!.

11. MYRISTICA LOWIANA, King in Ann. R. Bot. Gard. Calc. III. 293, t. 120 (1891). A tree reaching a height of 18—24 m. and 60—90 cm. in diam. of stem; branches spreading; branchlets rather stout, rough, dark-coloured. Leaves coriaceous; oblong, elliptic-oblong or sometimes slightly obovate, acute sometimes acuminate at apex, cuneate or rounded and sometimes unequal at base; upper surface shining, lower dull, subglaucous, both surfaces glabrous; margins recurved; 15—30 cm. long, 5—9 cm. broad; midrib very stout, somewhat impressed above, prominent beneath; main-nerves 16—20 pairs, prominent on both surfaces and impressed on the upper, parallel, at first straight, curved near the margin and interarching; transverse nervules visible and impressed on the upper surface; petiole 2—3 cm. long, stout. Flowers: ♂ in dense many-flowered rusty-pubescent glomeruli, shorter than the petioles, from small solitary thick tubercles 5 mm. long in the axils of the leaves or of fallen leaves; pedicels slender, 3.5—7.5 mm. long; bracteole ovate or obovate-rotund, embracing more than half the perianth on one side, glabrous within, 2—5 mm. long; perianth 2.5—3.5 mm. long, ovoid, rusty-pubescent without, glabrous within, cut to about one-third of the way down into 3 broadly triangular teeth; androecium ellipsoid, on a puberulous stalk much shorter than itself, together 2 mm. long; anthers about 10—14: ♀ not known. Fruit ovoid, pointed at each end, 6—8 cm. long, 3—4 cm. in diam. covered with soft rufous woolly tomentum; pericarp sinuate-ridged, the ridges appearing through the tomentum. Seed ellipsoid, blunt at both ends, about 5 cm. long; arillus thin, extending to the apex of the seed, its sides cut into wide areolæ. Warb. Monog. Myrist. 496.

PERAK: at Port Weld, *Scortechini* 1551!, 1855!; in rocky localities in forest up to 300 m. alt. near Larut, *King's Collector* 5537!, 7258!. MALACCA: at Merliman, *Goodenough* 1621!.

Ridley No. 10922 from Fort Canning, Singapore, is *Myristica guatteriiifolia*, A. DC.; Warb. Monog. Myrist. 412. In all probability it is from a cultivated plant. The tree is common in the Philippine Islands and has also been collected at Labuan in Borneo (*Motley* 139!)

4. KNEMA, Lour.

Dioecious trees with coriaceous or chartaceous leaves usually glaucous beneath, often covered with ferruginous tomentum; main nerves confluent near the margin; transverse nervules parallel, prominent. *Inflorescence* of unbranched densely racemose or subumbellate clusters usually on thick tubercular peduncles from the axils of the leaves or of fallen leaves; bracts caducous; flowers rather large, subglobose patelliform or urceolate, pedicellate; bracteoles persistent about the middle of the pedicels or above it; perianth 3-toothed. *Androecium* usually stalked; filaments connate in a peltate disk; anthers 8—20 free, attached by thin bases stellately to the margin of the disk, never erect, dehiscing downwards. *Style* short, thick; stigmas connate in a bilobed disk often dentate or laciniate at the margin. *Fruit* ovoid or oblong; pericarp thick, fleshy, tomentose; arillus laciniate at the apex only. *Seed* conform to the fruit; albumen ruminant; cotyledons scarcely connate at the base, divaricate or suberect.—*DISTRIB.* S. Asia from India to the Philippines and New Guinea, species about 38.

- ♂ flowers very large, about 1 cm. in diam.; leaves very long, 25—65 cm.; fruit large, with very thick wool; disk of androecium subconcave with 18—20 anthers 1. *K. HOOKEIANA.*
- ♂ flowers moderate-sized, 5—8 mm. in diam.; leaves 18—40 cm. long; fruit medium-sized, rufous-tomentose; disk of androecium convex with 13—15 anthers 2. *K. CANTLEYI.*
- ♂ flowers small, under 5 mm. in diam.
Disk of androecium convex-mammillate at top;
leaves narrow with parallel nerves 10—32 cm.
long, 2—9 cm. broad 3. *K. INTERMEDIA.*
- Disk of androecium not mammillate.
Pedicel of ♂ flower more than double as long as
the perianth.
Anthers 40—45, sessile, disc concave; leaves
small, 6—14 cm. long, 3—6 cm. broad,
nervules and reticulation scarcely visible .. 4. *K. CURTISII.*
- Anthers less than 20, mostly 8—13; disc flat,
anthers horizontal on short filaments on its
margin.
Pedicel of ♂ flower $4\frac{1}{2}$ —6 times longer than
perianth; anthers 9—12.
Leaves thinly coriaceous with 7—14 pairs
of main nerves; reticulation prominent 5. *K. KUNSTLERI*
- Leaves membranous with 13—18 pairs of
main nerves; reticulation obscure .. 6. *K. MALAYANA*

Pedicle of ♂ flower 2—4 times longer than perianth; anthers 8—18.

Young branchlets nearly glabrous; nervules weak; fruit large, 2.5—4.5 cm. long

7. *K. WRAYI.*

Young branchlets rusty-pubescent; nervules strong; fruit 3—4 cm. long

8. *K. CONFERTA.*

Pedicle of ♂ flower twice longer than the perianth or less than it.

Mature leaves glabrous beneath, at most the nerves a little hairy; pedicle almost always twice as long as the ♂ perianth; anthers suberect or erect on the margin of the usually flat or slightly concave disc.

Bark of the branchlets longitudinally cracked, black; leaves reddish-glaucous beneath, cordate at base; anthers 10—12

9. *K. FURFURACEA.*

Bark of the branchlets not longitudinally cleft.

Anther-bearing disk very small, its stalk long; anthers 6—10, suberect, leaves large, glaucous beneath, cordate

10. *K. OBLONGIFOLIA.*

Anther-bearing disk of ordinary diameter, its stalk short.

Leaves oblong-lanceolate 10—15 cm. long, 2—5 cm. broad; flowers about 8 in umbel

11. *K. MISSIONIS.*

Leaves lanceolate 8—14 cm. long, 2.5—4.5 cm. broad; flowers 3—4 in umbel

12. *K. GEMINATA.*

Mature leaves pubescent beneath and on the nerves; pedicle shorter than the ♂ perianth; stamens 6—9 erect on the margin of a small disk, stalk long

13. *K. LAURINA.*

Species of which the ♂ flower are unknown; mature leaves very large, appressed pubescent beneath; fruit over 5 cm. long

14. *K. RETUSA.*

1. *KNEMA HOOKERIANA*, Warb. Monog. Myrist. 251, t. xxiv. (1897).

A large tree reaching a height of 18—30 m. and 60—90 cm. in diam. of stem; branches spreading; branchlets stout, with dark grey bark peeling off in flakes, innovations densely covered with soft tawny flocculent wool. *Leaves* coriaceous; oblong-lanceolate or oblanceolate, obtuse or acute at apex, acute or somewhat rounded or even subcordate at base; both surfaces glabrous when adult, when young softly flocculent beneath, the upper shining, the lower subglaucous; 25—65 cm. long, 5—17 cm. broad; midrib stout, broad at base;

main nerves 20—30 pairs, prominent especially beneath, parallel, curving to close to the margin and then interarching; transverse nervules many, sub-parallel, prominent beneath; petiole very stout, 1—1.5 cm. long, at first thickly rusty-flocculent afterwards glabrous. *Flowers*: ♂ in clusters of from 6 to 9 from thick tubercles in the axils of fallen leaves nearly 1 cm. in diam., densely flocculent-woolly; pedicels 1—2 cm. long; bracteole broadly ovate, 2—3 mm. below the flowers, 5 mm. long; perianth obovoid, the teeth 3 broadly triangular, thick and fleshy, glabrous inside and longitudinally furrowed toward the base; andrœcium on an obconic furrowed stalk, disk subconcave glabrous bearing on the margin 18—20 sessile curved anthers: ♀ with shorter pedicels and broader teeth; ovary densely woolly, stigma subsessile, concave, with many irregular lobes. *Fruit* ellipsoid, 4.5—8 cm. long, 3—4 cm. thick, densely covered with a coating of dense silky fulvous wool, thicker than the crustaceous pericarp. *Seed* cylindric-ovoid; arillus thin, reniform, scarlet, completely enveloping the testa. *Myristica Hookeriana*, Wall. Cat. 6802 A; Hook. f. & Th. Fl. Ind. V. 156; A. DC. Prodr. xiv. 204; Miq. Fl. Ind. Bat. I. 2. 69, Suppl. 384; Hook. f. Fl. Br. Ind. V. 109; King Ann. Calc. III. 325, t. 163.

PENANG: *Wallich* 6802 A!; Government Hill, *Maingay* K.D. 1279!; *Curtis* 202!, 2479!; *Norris*!. PERAK: in hill forest near Goping and Larut at 120—240 m. alt., *King's Collector* 5754!, 6007!, 6656!. MALACCA: *Griffith* K.D. 4342!. SINGAPORE: *Cantley* 2904!; *T. Anderson* 10!; *Hullett* 314!; at Bukit Timah, etc., *Ridley* 2109!, 3701!.—DISTRIB. Borneo; Sumatra (at Ogan-Ulu, Palembang, *Teysmann*!).

2. KNEMA CANTLEYI, Warb. Monog. Myrist. 554, t. xxiv. (1897). A tree reaching 6—15 m. in height and 20—30 cm. in diam. of stem; branchlets moderately stout, pale reddish-brown with smooth bark, the young ones and innovations densely felted with rufous tomentum, the hairs branched. *Leaves* coriaceous; oblong or oblong-lanceolate, acute at apex, subacute or rounded at base; upper surface shining, glabrous, lower glaucescent, glabrous when old, when young flocculently rufous-tomentose; margins slightly recurved; 18—40 cm. long, 4—9 cm. broad; midrib prominent, raised on both surfaces; main nerves 15—20 pairs, raised above, curved to near the margin and then interarching, the lower in diminishing loops, the upper in single loops; transverse nervules subparallel, branching

into the netted reticulation; petiole stout, 1—3 cm. long, at first thickly rufous-tomentose, afterwards glabrous. *Flowers*: ♂ densely felted, rufous tomentose, in many-flowered sessile umbels from tubercles in the axils of leaves and of fallen leaves; pedicels 1—1.5 cm. long; bracteoles ovate, close to the perianth; perianth depressed, trigonous, obovoid-globose, 6 mm. in diam., lobes 3, broadly triangular, glabrous within; andrœcium surrounded by a raised disk, the stalk cylindric 1 mm. high, the peltate top convex, papillose, surrounded by the radiating anthers, anthers 13—15 with short filaments: ♀ subsessile in few-flowered clusters on tubercles as in ♂; buds ovoid, the bracteole minute, lobes 3 broadly triangular, glabrous within; ovary depressed globular, densely rufous-tomentose; stigma peltate, large, with 12 or more often-forked lobes. *Fruit* ellipsoid, blunt, densely covered with rufous-tomentum, about 3 cm. long, 2 cm. broad, supported by the persistent perianth-lobes. *Seed* narrowly obovate, pointed; arillus thin, entirely enclosing the testa. *Myristica Cantleyi*, Hook. f. Fl. Br. Ind. V. 110; King Ann. Calc. III. 327, t. 168.

PENANG: at Pulau Boetong, *Curtis* 2770!. PERAK: at Thaipeng, etc., *Wray* 2700!, 3126!; *Scortechini*!; in dense forest on low wet ground near Thaipeng and Larut, *King's Collector* 3350!, 5317!, 5614!, 6569!, 6867!, 7290!, 8443!. SINGAPORE: *Cantley* 195!, 3083!.

3. *KNEMA INTERMEDIA*, Warb. Monog. Myrist. 564, t. xxv. (1897). A tree reaching 12—24 m. in height and 30—45 cm. in diam. of stem; branchlets moderately stout with greyish rather smooth bark, younger thinly covered with minute scurfy rufous tomentum. *Leaves* coriaceous; narrowly oblong-lanceolate or oblong, acute or shortly acuminate at apex, shortly cuneate or rounded at base; upper surface shining, lower pale, both when young rusty-pubescent, afterwards glabrous; 10—40 cm. long, 2—9 cm. broad; midrib prominent, raised on both surfaces; main nerves 12—22 pairs, raised above, parallel, slightly curving to the margin and flatly interarching close to it; transverse nervules very many, raised and prominent on the upper surface and branching into the netted reticulation; petiole 10—13 mm. long, at first tomentose, afterwards glabrous and black, channelled. *Flowers*: ♂ in rusty-tomentose umbels of 6—8 from short rounded woody tubercles in the axils of leaves or of fallen leaves; pedicels rather slender, up to 1 cm. long; bracteole small, ovate, close under the perianth; perianth ovoid-

globose, subtrigonus, 4—7 mm. in diam., lobes triangular-ovate, glabrous and striate within; andrœcium convex-mammillate at top, the stalk very short, the disk radiating; anthers 12—15: ♀ in axillary umbels similar to ♂ but sessile, the bracteole embracing the perianth; perianth obovoid, lobes 3, acute; ovary ovoid, densely rufous-tomentose; stigma sessile with 6—8 short suberect narrow lobes. *Fruit* usually solitary, rarely in clusters of 2—3, 3·5—4 cm. long, 2 cm. in diam., ellipsoid, grooved on one side, covered with a thin layer of minute rufous tomentum. *Seed* ellipsoid, elongate, subrugose; arillus thin, entire or shortly laciniate towards the apex, completely enveloping the testa. *Myristica intermedia*, Bl. Rumph. I. 187; Hook. f. & Th. Fl. Ind. 158; A. DC. Prodr. xiv. 1. 206; Miq. Fl. Ind. Bat. I. 2. 70; Ann. I. 207; Hook. f. Fl. Br. Ind. V. 112; King Ann. Calc. III. 318, t. 154; Koord. & Val. Bijdr. IV. 192. *M. iteophylla*, Miq. l.c. 59. *M. corticosa*, Hook. f. & Th. var. *decipiens*, Miq. Ann. II. 57.

PENANG: Government Hill, etc., *Curtis* 1044!, 3402!; Waterfall Gardens, *Ridley* 10786!. PERAK: at Batu Togoh, etc., *Wray* 2130!; 3010!; at Haram Parah, *Scortechini* 631!, 803!; in dense forest on low ground up to 120 m. alt., *King's Collector* 5419!, 6146!, 6371!, 6704!, 7576!. MALACCA: *Griffith* K.D. 4359! (with diseased ♂ flower); *Maingay* K.D. 1281!; *Cantley* 525!. SINGAPORE: at Bukit Timah, *Cantley* 29!, 83!; *Lobb*!; at Tanglin, *Hullett* 5739!; *Ridley* 1820!, 7203!, 2039!, 2107!, 9222!.—DISTRIB. Java (*Koorders*!, *Forbes* 542!, etc.), Sumatra (*Forbes* 2573!), Borneo (*Korthals*), etc.

Var. *dubia*, Warb. *Leaves* broader, the transverse nervules very slender; branchlets, petioles and flowers densely furfuraceous.

PENANG: *Wallich* 6810!.

4. KNEMA CURTISII, Warb. Monog. Myrist. 567, t. xxv. (1897). A tree, all parts glabrous except the minutely puberulous leaf-buds and ♂ flowers; branchlets slender with greyish bark, uppermost light brown sometimes becoming nearly black. *Leaves* thinly coriaceous; elliptic, elliptic-ovate or -obovate, acute or subacuminate at apex, acute at base; upper surface shining, olivaceous when dry, lower dull, subglaucous; margin slightly recurved; 6—14 cm. long, 3—6 cm. broad; midrib slender; main nerves 9—16 pairs, slightly curved to interarch near the margin; secondary nerves few, transverse nervules irregularly subparallel, enclosing the prominent minutely netted reticulation; petiole about 1 cm. long, slender.

Flowers: ♂ in umbels of 3—10 from short woody axillary tubercles; pedicels slender, 6—10 mm. long; bracteole minute, near the base of the pedicels; perianth depressed-ovoid, trigonous, 3 mm. in diam., lobes 3 broadly triangular; andrœcium with a concave disk, sometimes slightly convex in the middle, the stalk short, thick, obconic; anthers about 40—45, sessile on the margin of the disk: ♀ in few-flowered umbels; pedicels scarcely shorter than in ♂; ovary ovoid, tomentose, the stigma with 6 radiating acute teeth. *Fruit* solitary or in pairs, ellipsoid or ovoid, often gibbous at the base, sometimes with two keels one more prominent than the other, 2.5—3 cm. long, about 2 cm. in diam., pericarp pale greenish orange, rusty-puberulous. *Seed* ovoid; arillus red, thin, entire or slightly lobulate at apex, completely enclosing the testa. *Myristica Curtisii*, King Ann. Calc. III. 326, t. 167. *Myristica* (*Maingay* 1301) Hook. f. Fl. Br. Ind. V. 113.

PENANG: Waterfall, etc., *Curtis* 1024!, 1301!, 3679!. PERAK: at Hermitage, *Curtis* 1320!; at Thaipeng, *Wray* 2112!; at Haram Parah, etc., *Scortechini* 292!, 763!. MALACCA: *Maingay* K.D. 1301!; *Alwis* 2240!; at Batu Tiga, *Derry* 1172!. NEGRI SEMBILAN: at Tampin Hill, *Goodenough* 1854!.

5. KNEMA KUNSTLERI, Warb. Monog. Myrist. 568, t. xxv. (1897). A tree reaching 9 to 15 m. and even to 30 m. in height with a stem of considerable diameter; branches spreading; branchlets slender, at first slightly and minutely rusty-tomentose as are the innovations, afterwards dark and glabrous. *Leaves* thinly coriaceous, glabrous, much reticulate when dry; elliptic or elliptic-oblong, sometimes ovate, shortly and often bluntly acute or acuminate at apex, sometimes obtuse, cuneate and rounded and slightly unequal at base; upper surface shining, greenish when dry, lower glaucescent, brownish white with small brown dots; 8—18 cm. long, 4—8 cm. broad; midrib rather slender, keeled above; main nerves 7—14 pairs, brown, scurfy and prominent on the lower surface, parallel, slightly curved and interarching near the margin; transverse nervules subparallel, hardly more prominent than the conspicuously netted reticulation; petiole stout, dark, 12—14 mm. long. *Flowers*: ♂ in 4—12-flowered rusty-pubescent umbels from short woody axillary tubercles; pedicels 7—10 mm. long, slender, the minute bracteole at or a little above the middle; perianth in bud depressed-globose, trigonous, 2—4 mm. in diam., when open spreading, lobes 3, fleshy, broadly triangular-ovate, concave, glabrous within; andrœcium with

short cylindric stalk, disc flat glabrous; anthers 9—12 horizontal, with short filaments attached to the edge of the disc: ♀ not known, ovary sessile, ovoid, rugulose; style very short glabrous; stigma with 3 short spreading conical lobes. *Fruit* usually solitary, yellow, sometimes in clusters of 2—3, pedunculate, 20—22 mm. long, 15—17 mm. in diam., broadly ovoid-globose, slightly apiculate, ferruginous-puberulous when young, afterwards glabrescent. *Seed* broadly ovoid, smooth; arillus red, thin, slightly lobed at the apex, completely enveloping the testa. *Myristica Kunstleri*, King Ann. Calc. III. 314, t. 149.

PERAK: Maxwell's Hill at 900 m. alt., *Curtis* 2051!; *Scortechini* 175!; at Gunong Keledang, *Ridley* 9587!; at Waterfall Hill and Blanda Mabok, *Wray* 2056!, 3985!; in hilly forests at various elevations up to 600 m. alt., *King's Collector (Kunstler)* 2614!, 2743!, 3372!, 3393!, 3510!, 4150!, 4216!, 4414!, 4605!, 4949!, 5867!, 6440!, 7180!, 10022!, 10549!, 10826!. SELANGOR: at Kwala Lumpur, *Ridley* 3538!.

6. KNEMA MALAYANA, Warb. Monog. Myrist. 570, t. xxv. (1897). A tree reaching 9—21 m. in height and 25—30 cm. in diam. of stem; branches spreading or drooping; branchlets rather slender, minutely rufous-pubescent when young, finally glabrous, dark and striate. *Leaves* membranous; narrowly elliptic or oblong-lanceolate, sub-acute or obtuse at apex, rounded or subcuneate at base; upper surface glabrous, shining, lower glaucescent; 9—15 cm. long, 3.5—6 cm. broad; midrib slender, keeled above; main nerves 13—18 pairs, spreading, prominent beneath, parallel, interarching near the margin; transverse nervules subparallel, prominent, enclosing the netted reticulation; petiole nearly 1 cm. long, slender. *Flowers*: ♂ in almost sessile axillary 5- to 8 flowered rusty-puberulous umbels from axillary or lateral tubercles; pedicels slender, 12—15 mm. long, bearing the minute bracteole above the middle; perianth in bud depressed-globose, bluntly 3-angled, 3 mm. in diam., lobes 3, broadly ovate, fleshy, striate and glabrous within; andrœcium on a short stalk thickened upwards, the disc flattened bearing 10—12 anthers radially on the margin: ♀ in fewer-flowered umbels than ♂, obovoid in bud; ovary sessile ovoid-globose, style short; stigma peltate, glabrous, with 4 acute lobes. *Fruit* small, ovoid or slightly obovoid, narrowed at the base, 12—14 mm. long, 9—11 mm. in diam., minutely rusty-tomentose. *Seed* ovoid-rotund, sessile, smooth; arillus thin, reniform, irregularly fimbriate at apex, enveloping the

testa. *Myristica glaucescens*, Hook. f. & Th. Fl. Ind. 157 non *Knema glaucescens*, Jack; Hook. f. Fl. Br. Ind. V. III in part; King Ann. Calc. III. 323, t. 161. *M. corticosa*, A. DC. Prodr. xiv. 1. 205 (in part); Miq. Fl. Ind. Bat. I. 2. 69 (in part).

PENANG: *Curtis*. PERAK: at Tapa Batang Padang, *Wray* 176!; in hilly forest up to 300 m. alt., *King's Collector* 4352!, 5706!, 5726!, 6128!, 7599!, 8541!, 10286!, 10594!. MALACCA: *Griffith* K. D. 4343!; *Maingay* K. D. 1280!, 1280/2!, 1299!; *Ridley* 7122!; at Ayer Panas, *Derry* 1038!. PAHANG: at Kwala Brok, *Ridley* 2263!. SINGAPORE: at Bukit Timah, *Cantley* 20!; Garden jungle, etc., *Ridley* 4136!, 4816!, 4817!.—DISTRIB. Burma.

7. *KNEMA WRAYI*, Warb. Monog. Myrist. 572, t. xxiv. (1897). A tree reaching to 30 m. in height and 60—90 cm. in diam. of stem; branches spreading; branchlets rather slender, glabrous, pale, striate. *Leaves* thinly coriaceous; narrowly elliptic or elliptic-oblong, acute or subacute rarely acuminate at apex, rounded or subcuneate at base; both surfaces glabrous, shining above, glaucous beneath; 16—24 cm. long, 6—9 cm. broad; midrib prominent beneath; main nerves 13—20 pairs, prominent beneath, parallel, nearly straight at first, then curved along the margin but scarcely interarched; transverse nervules very many, close, parallel, prominent, netted with the reticulation; petiole 10—12 mm. long. *Flowers*: ♂ in many-flowered compound rusty-puberulous umbels from short woody axillary tubercles; pedicels slender, 7—10 mm. long, bearing the small oblong pubescent bracteole above the middle; perianth in bud 3—4 mm. in diam., subglobose, lobes 3—4 ovate, thick, ridged inside; androecium on a short stout stalk, disc subtriangular, flat or subconvex, anthers 13—17 on short filaments, horizontal: ♀ not known. *Fruit* oblong-ovoid or ovoid 2.5—4.5 cm. long, 1—2.5 cm. broad, in axillary pedicellate pairs, cinereous, glabrescent, pericarp yellow. *Seed* oblong-ovoid or ovoid; arillus entire, thin, tough, completely enveloping the testa. King Ann. Calc. III. 315, t. 151.

PERAK: at Ulu Seding, *Wray* 2006!; in forest up to 150 m. alt., *King's Collector* 5299!, 6514!, 6521!, 7475!, 8277!, 10444!, 10691!. SINGAPORE: at Jurong, *Ridley* 3873!.

8. *KNEMA CONFERTA*, Warb. Monog. Myrist. 578, t. xxiv. (1897). A tree reaching 18—24 m. in height and 45—60 cm. in diam. of stem; branchlets rather stout, pale brown, striate, glabrous, the youngest densely covered with short stellate or branched rusty

tomentum. *Leaves* subcoriaceous; oblong or oblong-lanceolate, acute or acuminate at apex, rounded or slightly cordate at base; both surfaces minutely reticulate, the upper glabrous, shining, the lower when young and specially on the nerves with minute loose scurfy tomentum, ultimately glabrous and subglaucous; margins recurved; 13–27 cm. long, 4.5–6.5 cm. broad; midrib moderately stout, keeled above; main nerves 14–28 pairs, parallel, straight, curved and interarching near the margin; transverse nervules very many, subparallel, closely netted with the reticulation; petiole stout, 10–15 mm. long. *Flowers*: ♂ in densely crowded axillary clusters of 20–30 on woody tubercles, rusty-pubescent; pedicels 7–10 mm. long with the bracteole about the middle; perianth in bud subglobose, depressed, bluntly 3-angled, about 4 mm. in diam., the teeth broadly triangular, acute fleshy, glabrous within; androecium on an obconic striate stalk, the disc concave and sometimes slightly mammillate in the centre at first, afterwards flat, triangular; stamens 8–18 on short filaments, at first recurved, afterwards flat or even suberect: ♀ larger than ♂ but in smaller clusters obovoid or urceolate with 3 short subacute teeth; ovary depressed-globose, rufous-tomentose, style narrow, stigma cupshaped with lobed margins. *Fruit* axillary solitary or in pairs, ovoid, blunt, 3.5–4 cm. long, 2–2.5 cm. in diam., shortly rufous-pubescent when young, glabrescent when ripe, the pericarp thick. *Seed* ellipsoid, pointed; arillus covering the whole testa, minutely lacinate at the apex. *Myristica conferta*, King Ann. Calc. III. 365, t. 150.

PENANG: at Pulau Boetong, *Curtis* 2770!. PERAK: at Thai-peng, *Wray* 2377!; in dense jungle on low wet ground, *King's Collector* 6211!, 10295!. PAHANG: at Pulau Chengei, *Ridley* 2264!. MALACCA: *Griffith* K.D. 4345!; *Maingay* K.D. 1289!, 1294!. SINGAPORE: *Maingay* K.D. 1297!; at Bukit Mandai, *Ridley's Collector* 442!.—
DISTRIB. Andamans, Borneo.

Var. *Scortechinii*, Warb. *Leaves* longer, 16–32 cm. long, with thicker petioles. *Androecium* with flatter disc, the stamens horizontal with rather longer filaments. *Fruit* ovoid-globose shorter, longer pedunculate, the pedicels of the ♀ longer, 11–12 mm. *Myristica Scortechinii*, King Ann. Calc. III. 317, t. 153.

PERAK: at Goping, *Scortechinii* 178!; at Gunong Batu Pateh 1300 m. alt., *Wray* 285!, at Tapa, *Wray* 1422!; in hill forests from 100 to 450 m. alt., *King's Collector* 5617!, 5939!, 6043!, 6694!, 7926!, 10635!.

I have followed Warburg in reducing King's *M. Scortechinii* to a variety of *M. conferta*, but I cannot help feeling a little doubt in the matter. It is possible that further investigation on the spot will restore it to specific rank.

9. *KNEMA FURFURACEA*, Warb. Monog. Myrist. 581, t. xxiv. (1897). A tree reaching 18—24 m. in height and 60—90 cm. diam. of stem; branchlets stout, the younger ones densely covered with a thick furfuraceous tawny tomentum, the older glabrous with black bark much cracked. *Leaves* coriaceous; narrowly oblong-lanceolate, acute or acuminate at apex, cordate at base; upper surface shining, pale brown when dry, lower dull, reddish-glaucous, glabrous except on the midrib beneath; 10—50 cm. long, 3—13 cm. broad; midrib stout, broad at base, prominent, often rusty-tomentose beneath; main nerves 18—36 pairs, prominent, parallel, at first straight, then curved to and along the margin but scarcely inter-arching; transverse nervules subparallel, distinct, enclosing the rather obscure reticulation; petiole very stout, 10—14 mm. long, at first densely rusty-tomentose, afterwards glabrous. *Flowers*: ♂ in 6—8-flowered densely rusty-pubescent umbels from woody tubercles in the axils of the leaves or of fallen leaves; pedicels 7—10 mm. long, bearing the minute bracteole about the middle; perianth in bud obtusely trigonous subglobose, 4—5 mm. in diam., divided into 3 blunt triangular teeth, glabrous inside; andrœcium on a stout obconic furrowed stalk, the disc circular or slightly 3-angled, anthers 10—13 on the disc margin, curving upwards so as to open vertically: ♀ in fewer-flowered umbels, sessile, the bracteole at the base of the perianth, obovoid, 7—8 mm. long, with 3 teeth; ovary sessile, globose, densely rufous-tomentose, stigma sessile, concave, many-toothed. *Fruit* subglobose at first and densely rufous-tomentose, when ripe ovoid or ellipsoid, blunt, 2.5—3.5 cm. long, pericarp thick. *Seed* elliptic or oblong; arillus thin, completely enveloping the whole of the testa except at the extreme apex where it is divided into 5 or 6 narrow lobes. *Myristica furfuracea*, Hook. f. & Th. Fl. Ind. 159; A. DC. Prodr. xiv. 1. 206; Miq. Fl. Ind. Bat. I. 2. 70; Hook. f. Fl. Br. Ind. V. 112; King Ann. Calc. III. 318, t. 155. *M. longifolia*, Hook. f. & Th. l.c. 156 (*the Malayan material*).

PENANG: *Porter!*; *Phillips!*; various places, *Curtis* 1459!, 2456!, 2769!, 2827!. PERAK: in dense forest from the plain up to 360 m. alt., *King's Collector* 5600!, 5720!, 5819!, 6025!, 6059!, 6515!, 7551!, 10349!. MALACCA: *Griffith* K.D. 4346!; *Maingay* K.D. 2287!, 1288!; at Tubong, *Goodenough* 2001!; at Batu Tigali,

Holmberg 773!. SINGAPORE: *Cantley* 69!; *Murton* 150!.—DISTRIB. Sumatra (*Forbes* 2694!).

10. *KNEMA OBLONGIFOLIA*, Warb. Monog. Myrist. 586. t. xxiv. (1897). A shrub or small tree reaching 12 m. or more in height, stem slender; branchlets slender, at first minutely scurfily rusty-tomentose, afterwards subglabrous, the bark pale brown. *Leaves* membranous; oblong or oblong-lanceolate or -oblanceolate, rarely elliptic, acute or shortly acuminate at apex, truncate or cordate at base; upper surface glabrous, shining, lower dull, glaucous, when young with much loose stellate rufous hair; 15—40 cm. long, 4—10 cm. broad; midrib rather thick, prominent, impressed and keeled above; main nerves 20—28 pairs, spreading, parallel, sometimes distant, sometimes close, curved near the margin and the upper ones only interarching; transverse nervules rather obscure, subparallel; reticulation obscure; petiole stout, 1—2 cm. long, rufous-tomentose when young. *Flowers*: ♂ in 4—12-flowered umbels from short, woody, axillary tubercles; pedicels 5—10 mm. long, bearing the minute bracteole at the summit; perianth in bud obovoid or suburceolate, obtuse, 4 mm. long, 3 mm. in diam., lobes 3 broadly triangular, ribbed and glabrous within; andrœcium on a long cylindrical stalk, as long as the tube, disc very small, concave; anthers 6—10, sessile, suberect on the disc margin: ♀ sessile, in short but stoutly pedunculate 4—6-flowered axillary umbels; buds ovoid, lobes of perianth ovate blunt, glabrous within; ovary sessile, ovoid-conic, rusty-tomentose; style short; stigma of 2 rounded compressed lobes. *Fruit* in pairs or solitary, axillary, shortly peduncled, obovoid or ovoid, slightly pointed, sharply ridged, 3—3.5 cm. long, 2—2.5 cm. in diam.; pericarp thin, densely covered with harsh short rusty tomentum; peduncle 4 mm. long. *Seed* ovoid, mottled; arillus thin, deeply lobed, covering only the lower half of the testa. *Myristica oblongifolia*, King Ann. Calc. III. 313, t. 148.

PENANG: on rocky ground at about 250 m., *King's Collector* 1372!; *Curtis* 1044!. PERAK: in forest on low ground and up to 250 m., *King's Collector* 835!, 4534!, 5983!, 8645!. SELANGOR: Pahang Track, *Ridley* 8504!; Ginting Bidai, *Ridley* 7627!. MALACCA: at Ayer Panas, *Derry* 1038!. SINGAPORE: Garden jungle, *Ridley*!

Var. *monticola*, King. *Leaves* smaller, 15—25 cm. long, subsacute or rounded at base, the nerves fewer, the petiole more slender. *Flowers*: ♂ almost sessile on elongated tubercles, the stalk of the andrœcium longer. A hill variety.

PERAK: *Scortechini*!; at lower camp, Gunong Batu Pateh, 1000 m. alt., *Wray* 993!, 1077!, 1087!; in hilly forest at 750—1050 m. alt., *King's Collector* 3582!, 3810!, 6330!, 8322!, 10953!.

11. KNEMA MISSIONIS, Warb. Monog. Myrist. 602, t. xxv. (1897). A tree 6 to 15 m. high; branchlets slender, dark brown, minutely tawny-pubescent when young, ultimately glabrous and striate. *Leaves* membranous to chartaceous; oblong-lanceolate or oblanceolate or linear-oblong, acute or shortly acuminate at apex, attenuate at base, or sometimes rounded; both surfaces glabrous, upper shining, lower glaucous; 10—15 cm. long, 2—5 cm. broad; midrib slender, slightly impressed above; main nerves 13—16 pairs, slightly raised above, parallel, curving and interarching near the margin; transverse nervules irregular, reticulation obscure; petiole slender about 1 cm. long. *Flowers*: ♂ in rusty-puberulous umbels of about 8 on axillary or lateral tubercles which are at first short but elongate gradually to nearly 1 cm. long; pedicels slender, 5—7 mm. long with the bracteole near the summit; perianth in bud depressed globose, trigonous, about 3 mm. in diam., scurfy pubescent without, lobes 3 triangular, glabrous within; andrœcium on a short thick stalk, the disc subconcave bearing the 10—12 anthers suberect on its margin: ♀ in similar umbels on similar tubercles; pedicel much shorter with the bracteole close under the perianth; perianth urceolate, scurfily pubescent without, the lobes triangular; ovary conoidal, densely rusty-villous; style short, stigma bilobed, the lobes often again bifid. *Fruit* subglobose, rusty-pubescent, finally nearly glabrous, apiculate, 18 mm. long, 14 mm. in diam.; pericarp thin. *Seed* subglobose, smooth; arillus entire or only fimbriate at the apex *Myristica missionis*, Wall. Cat. 6788; King Ann. Calc. III. 321, t. 158. *M. lanceolata*, Wall. Cat. 6794. *M. corticosa*, Hook. f. & Th. Fl. Ind 158 (*in part*); A. DC. Prodr. xiv. 1. 205 (*in part*); Miq. Fl. Ind. Bat. I. 2. 69 (*in part*). *M. glaucescens*, Hook. f. Fl. Br. Ind. V. 111 (*in part*). *M. sphaerula*, Hook. f. Fl. Br. Ind. V. 859.

TONGKA: at Puket; *Curtis* 2925!. KEDAH: at Pulau Songsong, *Curtis*!. PENANG: *Wallich* 6788!; *Curtis* 700!, 935!. PERAK: *Cantley*. MALACCA: *Griffith* K.D. 4344!; *Miller* 9!; *Maingay* K.D. 1282!, 1299!; *Hervey*!; *Cuming* 2315!; *Cantley*! (*M. sphaerula* Hk. f. type). PAHANG: at Pulau Manis, *Ridley* 2262!. SINGAPORE: *Wallich* 6794!; *Ridley* 4816, 4817, 6447!?.—DISTRIB. Burma, Borneo.

12. KNEMA GEMINATA, Warb. Monog. Myrist. 804, t. xxv. (1897). A tree: young branches slender, rufous-furfuraceous, ulti-

mately glabrous, with two obscure ridges decurrent from the leaf-bases. *Leaves* pergamaceous; oblong lanceolate, subacuminate at apex, cuneate or rounded at base; upper surface shining, lower glaucescent, when young golden rusty-tomentose; 8—14 cm. long, 2·5—4·5 cm. broad; midrib slender, main nerves 12—16 pairs, thin but prominent beneath, spreading, curving near the margin and rather obscurely interarching: transverse nervules irregular, obscure as is the reticulation; petiole about 1 cm. long, slender, dark, channelled. *Flowers*: ♂ in 3—4-flowered sessile umbels on short axillary tubercles; pedicel slender, 6 mm. long, the bracteole above its middle; perianth in bud subglobose, rufous-puberulous, 3 mm. in diam., lobes 3, subacute, glabrous and striate within; androecium on a short glabrous stalk, the disc flat, glabrous, with 9—10 sessile radiate anthers on its margin, curving upwards: ♀ not known. *Fruit* axillary, usually in pairs, often solitary, ellipsoid or ovoid, blunt at apex, narrowed at base, ridged at the sides, 2—2·5 cm. long; pericarp thin. *Seed* shining; arillus thin, fleshy, entire, slightly lacinate below the apex. *Myristica geminata*, Miq. Fl. Ind. Bat. Suppl. 385, Ann. I. 207; King Ann. Calc. III. 322, t. 160.

PENANG?: *Curtis* 3679!. PERAK: at Kurow, *Scortechini* 1527!. JOHORE: at Gunong Palai, *G. King*!.—DISTRIB. Burma, Sumatra (*Forbes* 2911!).

13. KNEMA LAURINA, Warb. Monog. Myrist. 606, t. xxiv. (1897). A tree reaching 12—20 m. in height and 30—45 cm. in diam. of stem; branchlets rather stout, pale brown, faintly striate, the youngest harshly rufous-tomentose. *Leaves* chartaceous; oblong or oblong-obovate or -oblanceolate, acute or acuminate at apex, rounded or subcordate, often unequally, at base; upper surface shining, glabrous, lower surface tomentose, thickly on the nerves, sparsely on the parenchyma between them, hairs stellate; margin slightly recurved; 10—30 cm. long, 4—10 cm. broad; midrib rather slender, raised above; main nerves 12—24 pairs, parallel, impressed above, spreading, curved near the margin and more or less interarching; transverse nervules thin, subparallel, enclosing the minutely netted areolation; petiole about 1 cm. long, thick, rufous-tomentose. *Flowers*: ♂ in dense, axillary, rufous-tomentose, many-flowered umbels on thick tubercles; pedicel 2—3 mm. long, bearing under the perianth the rather large ovate bracteole; perianth in bud obovoid, 3—4 mm. long, 3-lobed; androecium long-stalked, the stalk widening afterwards, striate, 2 mm. long, disc small, glabrous, concave, bearing

6—9 erect sessile anthers: ♀ in umbels on tubercles as in ♂; ovary sessile, depressed-globose, densely rufous-tomentose; style 0, or very short; stigma 2-lobed, the lobes patent, toothed. *Fruit* ovoid or ellipsoid, 2.5—3 cm. long, 1.5—2 cm in diam.; pericarp leathery, densely covered with coarse rufous tomentum. *Seed* ellipsoid; arillus thin, red, entire, completely enveloping the testa. *Myristica laurina*, Bl. Rumph. I. 189, t. 61; DeVriese Pl. Reinw. 96; Miq. Fl. Ind. Bat. I. 2. 71 and Suppl. 385; Hook. f. Fl. Br. Ind. V. 112 (*excluding spec. Maingay*); King Ann. Calc. III. 319, t. 156; Koord. & Val. Bijdr. IV. 186. *M. tomentosa*, Bl. (*non* Thunb.) Bijdr. 577.

PENANG: Pulau Boetong Reserve, *Curtis* 1191!; Moniot's road, *Curtis* 2457!. PERAK: Waterloo *Curtis* 2728!; at Haram Parah, etc., *Scortechini* 54!, 830!, 831!; in thick forest at 100—300 m. alt., *King's Collector* 4307!, 5092!, 7452!, 7686!. MALACCA: at Bukit Panchur and Batu tiga, *Derry* 485!, 979!; at Sungei Hudang, *Ridley* 1800!. SINGAPORE: *Ridley* 2044!.—DISTRIB. Java, Sumatra, Borneo, etc.

14. KNEMA RETUSA, Warb. Monog. Myrist. 642, t. xxv. (1897). A tree, reaching 12—18 m. in height and 40—50 cm. in diam. of stem; branchlets stout, striate, pale brown and cinereous when dry. *Leaves* very large, coriaceous; oblong, elliptic-oblong or -obovate, obtuse or retuse at apex, rounded or subcordate at base; upper surface glabrous, shining, lower pale brown or whitish from a uniform layer of dense minute cinnamomeous hairs; margins recurved; 35—55 cm. long, 14—21 cm. broad; midrib stout, impressed above; main nerves 16—24 pairs, spreading subhorizontally and straight near the base, gradually more and more curved towards the apex and interarching; transverse nervules many, subparallel, prominent above; petiole stout, 1—2 cm. long. *Flowers* not known. *Fruit* 2—3 together on short thick tubercles from the scars of fallen leaves, ovoid, apiculate, gibbous on one side at the base, 5—6 cm. long, 5 cm. in diam.; pericarp thick, minutely rufous-tomentose. *Seed* narrowly obovoid, smooth; arillus very small, merely embracing the base of the seed, thin, much fimbriate. *Myristica retusa*, King Ann. Calc. III. 330, t. 171.

PERAK: in dense jungle, Gunong Bubu range, 150—250 m. alt., *King's Collector* 7690!.

Family CIMONIMIACEÆ.

Trees or shrubs, rarely scandent, often aromatic. *Leaves* opposite, rarely alternate, entire or serrate, usually coriaceous, exstipulate. *Flowers* 1—2-sexual, regular, usually in short cymes or racemes; bracts small or 0, or 2 valvately enclosing the bud. *Perianth* inferior, globose ovoid or depressed, rarely campanulate; limb 4—many-toothed, teeth in one or several series, equal, or the outer sepaloid and the inner petaloid, sometimes obsolete when the perianth is calyptrate. *Stamens* few or many in one or many series on a disk adnate to the perianth tube, included; filaments short, simple or with basal scales; anthers erect, 2-celled, opening by slit or by valves opening upwards; staminodes in ♀ flowers usually none. *Carpels* many or rarely solitary, sessile on the disk or on the sides of the perianth-tube, or immersed in a disk, 1-celled; styles long or short, stigma small; ovule solitary, erect or pendulous, anatropous or orthotropous. *Fruit* a drupe, free or enclosed in the disk or on a discoid receptacle, indehiscent. *Seed* erect or pendulous; testa membranous; albumen fleshy; embryo near the hilum and minute, cotyledons usually flattened; radicle superior or inferior.—DISTRIB. Genera 31, species 253 (according to Perkins and Gilg in Engler's Pflanzenreich), chiefly in tropical America, also in Africa, Australia and the Pacific Islands, a few only in tropical Asia.

Stamens 4, the anther-cells distinct and dehiscing
 longitudinally 1. MATTHÆA.
 Stamens 8, the 4 outer larger than the 4 inner, the
 anther-cells confluent 2. KIBARA.

1. MATTHÆA, Blume.

Trees or shrubs. *Leaves* opposite, entire or subserrate, petiolate, glabrous. *Flowers* fasciculate in the axils of the leaves or at the nodes of the branches below them, monœcious, pedicelled. *Perianth* depressed-turbinate, with 4 minute lobes at the nearly-closed mouth, at length circumsciss, the top dehiscent. *Stamens* 4 on the flattened receptacle of the ♂ flower; filaments very short; anthers ovoid, 2-celled, longitudinally dehiscing; pistillode of ♂ flower minute. *Carpels* many, on the broad flattened receptacles of the ♀ flower; style short, conical; ovule solitary, pendulous, anatropous. *Fruit* a fleshy pedunculate drupe, one or several on the persistent enlarged flattened receptacle. *Seed* pendulous; albumen fleshy; cotyledons

small, flat; radicle clavate, superior.—DISTRIB. About 3 species in the Malay Peninsula and Archipelago.

Perianth of ♂ convex in bud, leaves under 20 cm. long.

Leaves oblong, 3—6 cm. broad 1. *M. SANCTA*.

Leaves oval-oblong, 4—8 cm. broad 2. *M. LATIFOLIA*.

Perianth of ♂ concave in bud, leaves over 20 cm. long,

6 cm. broad 3. *M. CALOPHYLLA*.

1. *MATTHÆA SANCTA*, Blume Mus. Bot. Lugd.-Bat. II. 90., t. x. (1849). A tree, reaching 12 to 15 m. in height and 25—40 cm. in diam. of stem; branchlets smooth, glabrous, ashy-grey, terete, the uppermost somewhat flattened. *Leaves* chartaceo-coriaceous; oblong, rather abruptly short- or long-acuminate at apex, acute at base; margins entire, recurved; both surfaces glabrous, glossy green when fresh, greyish when dry especially beneath; 10—20 cm. long, 3—6 cm. broad; midrib stout, prominent, keeled above; main nerves 6—9 pairs, more or less impressed above, prominently raised beneath, curved outwards and joined near the margin by prominent intramarginal arches; secondary nerves between the main nerves also joining the arches and often branched; reticulation irregularly netted; petiole stout, twisted, channelled, 4—10 mm. long. *Flowers* in subumbellate cymes or fascicles in the axils of the leaves or of fallen leaves; bracts small, pubescent; peduncles stout, puberulous, about 5—10 mm. long; pedicels slender, pubescent, flattened, those of ♀ 2—4 cm. long, enlarged in fruit, those of ♂ flowers shorter; perianth turbinate, that of ♂ flowers 4—5 mm. broad with conical apex and 4 minute lobes, that of ♀ flowers 6—13 mm. broad with depressed apex and obscure lobes, circumsciss at the broadest point. *Stamens* 4, filaments very short, connective broad. *Carpels* α , subulate, pubescent. *Fruit* an ovoid drupe about 2—2.5 cm. long by 1—1.5 cm. in diam., angled, many together, stalked, on the enlarged perianth base; pericarp crustaceous, indigo-blue when ripe. *Seed* oblong, about 1.5 cm. long, with prominent funicle and broad hilum; albumen thick; cotyledons ovate-oblong, flattened, 4—6 mm. long; radicle as long as cotyledons, thick. A. DC. Prodr. xvi. 2. 670; Miq. Fl. Ind. Bat. I. 2. 74; Hook. f. Fl. Br. Ind. V. 115; Perkins & Gilg in Engl. Pflanzenreich IV. 52, fig. 10, 1—4 and xlix 18.

PERAK: *Wray* 2811!; at Gunong Haram, *Scortechini* 704!; in dense forest on mountains near Thaiping and Larut at 700—1200 m. alt., *King's Collector* 6380!, 8455!. MALACCA: *Maingay* K.D. 1308!. SINGAPORE: Garden jungle, *Ridley* 107!—DISTRIB. Sumatra, Borneo.

2. *MATTHÆA LATIFOLIA*, Perk. in Engler's Bot. Jahrb. xxv. 563, fig. 10, 5—7 (1898). A glabrous shrub or small tree; branchlets greyish with yellowish patches and lenticels. *Leaves* chartaceo-coriaceous; oval or oval-oblong, shortly acuminate at apex, rounded-cuneate at base; glabrous on both surfaces, the upper greenish when dry, the lower reddish-brown except the nearly white nerves; margins slightly recurved; 10—20 cm. long, 4—8 cm. broad; midrib rather slender, prominent, keeled above; main nerves 8—10 pairs, prominent on the under surface, curving outwards to join in prominent intramarginal loops; secondary nerves between the main nerves also joining the arches and branched; reticulation loose, irregular; petiole 1—1.5 cm. long. *Flowers* in umbels on axillary or lateral tubercles, pedicels 5—6 mm. long, ♂ 1—1.5 mm. in diam.; receptacle depressed-cupular; ♀ 4—5 mm. broad, flattened. *Stamens* 4, filaments very short, anthers ovoid. *Carpels* α , subulate, pubescent. *Fruit* a bluish-red ovoid drupe 15—17 mm. long, 5—7 mm. in diam.; pericarp crustaceous. Perk. in Engl. Pflanzenreich iv. 52, t. 10, 5—7 and xlix. 17, t. 7 B.C.

MALACCA: *Maingay* 1308!.—DISTRIB. Java (cult.).

The description is partly taken from Miss Perkins'—it does not seem to me that it differs much from *M. sancta*. The sheets in the Calcutta Herbarium show narrower leaves than do the specimens at Kew.

3. *MATTHÆA CALOPHYLLA*, Perk. in Engl. Bot. Jahrb. xxv. 563 (1898). A tree (?); branchlets smooth, pale brown, glabrous except when quite young, innovations tawny-pubescent; pith large. *Leaves* submembranous; ovate- or elliptic-oblong, abruptly cuspidate-acuminate at apex, rounded or subacute at base; both surfaces glabrous, the lower slightly reddish when dry; margins entire, cartilaginous; 20—30 cm. long, 7—9 cm. broad; midrib stout, main nerves 8—10 pairs, pale, the lowest pair from quite at the base, the rest distant, curving upwards and joining, especially the upper ones, in broad arches, outside which are smaller arches forming intramarginal nerves; secondary nerves and reticulation also pale, irregular, branching; petiole straight, 1.5—2 cm. long, channelled. *Flowers* in short subumbellate pubescent cymes in the axils of the leaves or of fallen leaves; rhachis very short; pedicels slender, flattened, 1—2 cm. long, bracteolate about the middle, elongating and thickening in fruit; perianth in ♂ obovate-globose, 6 mm. in diam., deeply concave; in ♀ depressed globose, 5 mm. in diam., the apex conical,

circumsciss at the broadest part, the top calyprate deciduous, the base not much (up to 6 mm.) enlarged in fruit. *Stamens* 4, sessile, the anthers ovate. *Carpels* many, glabrous except for villous hairs at the base; style curved, subulate; ovule rather large. *Fruit* (immature) an ovate slightly angled drupe 12—15 mm. long on a slender stalk about 10 mm. long, several together on the only slightly enlarged perianth base; pericarp black when dry. Perk. and Gilg in Engl. Pflanzenreich IV. 52 and XLIX. 16. t. 7 A.

SINGAPORE: at Bidasi, Angmoko, Bukit Timah, Chanchu Kang, etc., Ridley 9165!.—DISTRIB. Borneo (Sarawak, Beccari 3236!), Philippines.

2. KIBARA, Endl.

Trees or shrubs. *Leaves* opposite, entire or dentate. *Flowers* monœcious, small, in axillary or lateral cymes or panicles; bracts very small. *Perianth* ovoid, globular or hemispherical, nearly closed by 4 short lobes in 2 series, those of ♂ erect, those of ♀ inflexed, hooked; pedicels usually long; in fruit the ♀ perianth circumsciss above the disk which is much enlarged and often reflexed. *Stamens* 5—8, 2-seriate; filaments thickened; anthers 1-celled, opening vertically in 2 unequal valves; staminodes in ♀ flowers 0. *Carpels* many, free, on the inside of the urceolate perianth; style very short; ovule 1, pendulous, anatropous. *Fruit* a fleshy sessile or stipitate drupe, many together seated on the enlarged perianth-tube. *Seed* conform to the drupe; testa membranous; albumen fleshy; cotyledons flat, leafy, ovate; radicle thick, superior.—DISTRIB. According to Perkins and Gilg 15 species, in the Malay Peninsula and Archipelago.

The latest work on this genus is that by Miss Janet Perkins in Engler's Bot. Jahrb. xxv. (1898) and in Engler's Pflanzenreich Heft 4 (1901) and Nachtrage Heft 49 (1911). In describing the species of the genus *Kibara* she refers to three of the four species described from the Malay Archipelago by Blume in his Mus. Bot. Lugd.-Bat. Vol. II, pp. 88, 89, different Malay Peninsula specimens which in the Flora Indica and Flora of British India had been placed under *K. coriacea*, Endlicher, as they had previously been placed by Miquel in the Fl. Ind. Bat. Thus: Griffith's No. 4365 from Malacca is referred to *K. cuspidata*, Blume, as is Maingay's No. 1307; while Curtis' 2255 from Penang is attributed to *K. chartacea*, Blume, *K. coriacea* is considered as only a Javanese species, with its variety *serrulata* first raised to specific rank and then in the Nachtrag reduced to varietal. Miss Perkins lays much stress on the texture of the leaves and I have found it very difficult to follow her in

this. The series of specimens belonging to the Calcutta Herbarium at my disposal seemed to me as regards leaves to be very difficult to separate, and I found it difficult to obtain characters from the flowers and fruit. After much consideration it appeared to me that the best characters were to be got from the inflorescence, and I consequently have thought it best to try and follow Miss Perkins as far as possible and to arrange the material accordingly. I cannot say that I am fully satisfied with the result, but I do not see my way to anything better and I should greatly hesitate to make new species of any of the material without better reasons than I can give at present. I have consequently divided the material among the four species *K. chartacea*, *K. cuspidata*, *K. coriacea* and *K. serrulata*, the best-marked of which is probably the last. It is quite possible that the next monographer will reduce at any rate the first three to one species.

Inflorescence 2—3 cm. long	1. <i>K. CUSPIDATA</i> .
Inflorescence to 10 cm. long	2. <i>K. CHARTACEA</i> .
Inflorescence to 14 cm. long.	
Pedicels 6—7 mm. long	3. <i>K. CORIACEA</i> .
Pedicels 20—25 mm. long	4. <i>K. SERRULATA</i> .

1. *KIBARA CUSPIDATA*, Blume in Mus. Bot. Lugd.-Bat. II. 89 (1852—56). A shrub or small tree reaching at most 4—5 ft. in height; branchlets stout, smooth. *Leaves* chartaceous; ovate or elliptic, shortly cuspidately acuminate at apex, cuneate to almost rounded at base; both surfaces glabrous, yellowish when dry; margin recurved, entire or slightly and distantly serrate or undulate in the upper half; 12—30 cm. long, 6—15 cm. broad; midrib stout; main nerves 5—7 pairs, irregular, at first straight then curved, the upper ones to meet in loops at from 6 to 10 mm. from the margin; secondary nerves few, reticulation irregular, conspicuous on the under surface especially; petiole 1—2 cm. long, channelled above. *Flowers* in much-branching axillary pubescent cymes 2—3 cm. long; pedicels slender, up to 15 mm. long in ♂, stouter and up to 10 mm. in ♀; bracts deciduous, bracteoles as the perianth-tube minute, ovate; perianth-tube ovoid, lobes very small, hooked within in ♀. *Carpels* pubescent. *Drupe* ellipsoid, 15 mm. long, 10 mm. in diam., smooth, seated on the fleshy, lobed, enlarged receptacle; enlarged pedicels clavate, 8—10 mm. long. Perk. in Engl. Bot. Jahrb. 573 and Monog. 61, Nachtr. 33. *K. coriacea*, Endl.; Hook. f. and Th. Fl. Ind. 166 and Hook. f. Fl. Br. Ind. V. 114 *in part only*.

PENANG: Government Hill, 360 m., *Curtis* 1242!. PERAK: at Tupa, 60 m. alt., *Wray* 829!; at Ulu Bubong, in dense forest at 120—180 m. alt., *King's Collector* 10415!, 10455!. MALACCA: *Griffith* K.D. 4365!; *Maingay* K.D. 1307!.—DISTRIB. Sumatra.

KIBARA CHARTACEA, Blume in Mus. Bot. Lugd.-Bat. II. 89 (1852—56). A small tree reaching 7—8 m. in height; branchlets rather stout, smooth, pale brown. *Leaves* subcoriaceous; elliptic or ovate or ovate oblong, shortly cuspidate-acuminate at apex, acute or rounded at base; both surfaces glabrous, yellowish when dry; margin slightly recurved, entire or minutely distantly serrate on the upper half; 15—30 cm. long, 8—16 cm. broad; midrib fairly stout, raised above; main nerves 6—8 pairs, prominent, irregular, curved, the upper ones meeting in loops; secondary nerves and reticulation irregularly netted, prominent on the lower surface; petiole stout, channelled, 1.5—2 cm. long. *Flowers* in axillary pedunculate cymes reaching 10 cm. in length in fruit, branches dichotomous. *Drupe* ovate acuminate, up to 15 mm. long, 10—12 mm. in diam., slightly rugose; enlarged receptacle lobed; pedicel thick, about 5 mm. long. Perk. in Engl. Bot. Jahrb. xxv. 572 and Monog. 61. *K. coriacea*, Endl.; Hook. f. and Th. Fl. Ind. 166 and Hook. f. Fl. Br. Ind. V. 144 *in part only*.

PENANG: back of W. hill road to Batu Ferengy, *Curtis* 2255!; rocky jungle near Thaipeng, 250—300 m., *King's Collector* 8524!.—
DISTRIB. Sumatra.

3. KIBARA CORIACEA, Tul. in Archiv. Mus. Hist. Nat. Paris VII. 404 (1855). A small tree, reaching 4.5 m. in height; branchlets rather stout, smooth, brown. *Leaves* subcoriaceous; ovate or oblong-ovate or lanceolate, acute at apex, cuneate at base; both surfaces glabrous, yellowish when dry; margin entire or very distantly and inconspicuously toothed in the upper half; 16—22 cm. long, 7—10 cm. broad; midrib moderately stout; main nerves 6—8 pairs, curved, the upper ones meeting in loops about 5 mm. within the margin; secondary nerves few, reticulation irregular, prominent on the under surface; petiole 1—1.5 cm. long, channelled. *Flowers* in axillary or lateral, puberulous, panicles of cymules reaching 14 cm. in length; cymules subumbellate; pedicels curved, flattened, clavate, 6—7 mm. in length; bracteoles 2, near the base of the flower; perianth of ♀ circumscrib, the lobes deciduous. *Carpels* pubescent. *Drupe* ovoid, acute. Hook. f. and Th. Fl. Ind. 166 and Hook. f. Fl. Br. Ind. V. 114 *in part*; Miq. Fl. Ind. Bat. I. 2. 73; Perk. in Engl. Bot. Jahrb. xxv. 576, Monog. 63 and Nachtr. 35; Koord. Exkurs. Fl. Jav. II. 259. *K. Blumei*, Steud. Nomencl. Bot. I. 846; Bl. Mus. Bot. Lugd Bat. II. 88, t. ix.

PERAK: Singie Rajah, *King's Collector* 1005! —DISTRIB. Java, etc.

4. *KIBARA SERRULATA*, Perk. in Engl. Bot. Jahrb. 575 (1898). A tree reaching 12—15 m. in height (*Kunstler*), a large shrub (*Curtis*); branches stout, branchlets smooth, pale brown. *Leaves* chartaceous; oblong-ovate or -obovate, acuminate at apex and often sphacelate attenuate to rounded at base; both surfaces glabrous, yellowish when dry; margins distantly serrulate in the upper half; 20—30 cm. long, 8—16 cm. broad; midrib stout, raised above; main nerves 7—8 pairs, very irregular, the lower curving to fade away in loops, the upper curving to meet in loops at about 5—10 mm. from the margin; reticulation irregular, prominent; petiole stout, 1—2 cm. long, channelled. *Flowers* in axillary subterminal or lateral pedunculate panicles of subumbellate cymes, reaching 10—15 cm. in length; pedicels of ♂ very slender, about 2 cm. long, of ♀ stouter, about 2.5 cm., both puberulous. *Stamens* and *Carpels* pubescent. *Drupe* ellipsoid, beaked, subrugose, 16 mm. long, 10 mm. in diam.; enlarged pedicels cylindric, 5 mm. long, receptacle 1—1.5 cm. broad. Perk. Monog. 62, t. 16 A.; Koord. Exkurs. Fl. Jav. II. 259. *K. Blumei*, Steud.; Blume Mus. Bot. Lugd.-Bat. II. 88, var. *serrulata*; Perk. Monog. Nachtr. 36.

PENANG: at Waterfall, *Curtis*!. PERAK: Ulu Telama, *Scortechini* 1307!; near Gunong Malacca, *King's Collector* 7205! —DISTRIB. Java.

Family CV. THYMELÆACEÆ.

Shrubs or trees with tough fibrous bark, rarely herbs. *Leaves* alternate or opposite, simple, quite entire. *Flowers* usually hermaphrodite, in axillary or terminal heads, umbels, clusters, spikes or racemes; bracts various, often forming an involucre. *Perianth* regular, tubular or campanulate, often corolline, 4—5-lobed, the lobes imbricate in bud, often with scales at their bases within. *Stamens* as many or twice as many as the lobes of the perianth, rarely half as many, adnate to the tube of the perianth, those opposite the lobes usually attached above the alternate ones; filaments short, rarely as long as the anthers; anthers erect, 2-celled, the cells parallel, dehiscing longitudinally. *Disk* hypogynous, annular cupular or of scales, sometimes 0. *Ovary* superior, 1—2-celled; ovules 1 in each cell, anatropous, pendulous from the apex of the cell; style short or long, terminal or excentric; stigma usually

capitate. *Fruit* a small berry drupe or capsule. *Seed* solitary or one in each cell, pendulous or lateral; albumen fleshy or 0; embryo straight; cotyledons fleshy, usually thick; radicle short, superior.—**DISTRIB.** About 40 genera, about 360 species, in temperate and tropical regions.

Ovary 1-celled, 1-ovuled; fruit indehiscent (Tribe I. EUTHYMELEÆ).

Perianth without scales, lobes 4; stamens as many as and opposite to the lobes or twice as many.

Leaves alternate; hypogynous disk usually 0 .. 1. DAPHNE.

Leaves usually opposite; hypogynous disk of 1—4 membranous scales 2. WIKSTRÆMIA.

Perianth with scales above the stamens, lobes 5; stamens twice as many as lobes.

Stamens in one row; scales 10, free or connate in pairs, long 3. LINOSTOMA.

Stamens in two rows; scales 5, bifid or bilobed, short 4. ENKLEIA.

Ovary 2-celled, cells 1-ovuled; fruit a loculicidal capsule (Tribe II AQUILARIÆ) 5. AQUILARIA.

1. DAPHNE, L.

Erect or prostrate shrubs, sometimes small trees. *Leaves* alternate, scattered or congested, evergreen or deciduous. *Flowers* hermaphrodite, in terminal or lateral sessile or peduncled heads or short racemes, the heads sometimes with involucrate bracts. *Perianth* tubular or funnel-shaped; lobes 4, the throat without scales. *Stamens* in 2 superposed rows of 4 each; filaments short; anthers oblong. *Disk* hypogynous, tubular; often 0. *Ovary* 1-celled; ovule 1, pendulous; style short; stigma capitate. *Fruit* a fleshy or coriaceous drupe, globose or ovoid. *Seed* 1; testa crustaceous; albumen none or scanty; cotyledons fleshy, plano-convex.—**DISTRIB.** About 80 species, in subtropical and temperate Europe, Asia and N. Africa.

DAPHNE COMPOSITA, Gilg in Engl. and Prantl. Naturl. Pflanzenfam. III. 6 A. 238 (1894). A shrub or small tree reaching 3 to 6 m. in height and 10 cm. in diam. of stem (Kunstler); branchlets slender, brown, with fibrous inner bark, glabrous. *Leaves* membranous, lanceolate or oblong-lanceolate, acuminate at apex and at base; glabrous, dark green above, pale or glaucescent beneath; 8—18 cm. long, 2—5 cm. broad; midrib slender, pale beneath; main nerves 10—14 pairs, at first nearly at right angles with the midrib, curved near the margin where they anastomose; secondary nerves many,

prominent as is the reticulation; petiole slender, short, 2—5 mm. long. *Flowers* white, in heads of 5—9, sessile on a silky villous receptacle, on slender peduncles 2—7 cm. long; in bud protected by an involucre of 2 concave suborbicular reddish imbricating bracts pubescent to nearly glabrous without, minutely pubescent within. *Perianth* tubular, densely white-silky-villous without, glabrous within, 7—9 mm. long; lobes ovate, acute or obtuse, 2—3 mm. long, alternately short and long. *Stamens* 8, the upper 4 opposite the perianth-lobes, the lower 4 alternate with them; anthers oblong, yellow, 1 mm. long; filaments very short. *Ovary* glabrous below, densely silky-villous above; hypogynous disk membranous, brown, tubular, dentate, 1—1.5 mm. long; style slender; stigma large, capitate. *Fruit* an ovoid glabrous drupe, about 5 mm. long. Koord. Exkurs. Fl. Jav. II. 657. *D. pendula*, Smith Plant. Ic. ined. II. t. 34 (1790); Wickst. Monog. Daphn. 12; Meissn. in DC. Prodr. XIV. 540; Kurz For. Fl. II. 333; Hook. f. Fl. Br. Ind. V. 194; Miq. Fl. Ind. Bat. I. 1. 877. *D. montana*, Meissn. in Regensb. Denkschr. III. 284. *Scopolia composita*, Linn. fil Suppl. 409 (1781). *Eriosolena montana*, Bl. Bijdr. 651; Hassk. Cat. Bogor. 92.

PERAK: at Bujong Malacca, *Ridley* 9682!, at Ulu Batang Padang, *Ridley* 13707!; Birch's Hill, *Wray* 510!; *Scortechini* 531!; in dense jungle on mountain tops, Larut, etc., at 1000—1400 m. alt., *King's Collector* 3812!, 6940!. SELANGOR: at Bukit Kutu, 900 m. alt., *Ridley* 7614!.—DISTRIB. Burma, Java (*Kurz!*, *Hasskarl!*, *Lobb* 247!, *deVriese!*, *Forbes* 1103!), Sumatra (*Teysmann!*; *Beccari* 2!; *Forbes* 1856!, 2468!).

2. WIKSTRÆMIA, Endl.

Shrubs, rarely trees. *Leaves* opposite, rarely alternate. *Flowers* hermaphrodite, in terminal or axillary spikes or racemes, ebracteate. *Perianth*-tube slender, elongate; lobes 4, spreading, the throat naked. *Stamens* 8, in two series, the upper opposite the perianth-lobes near the mouth, the lower alternate with them at mid-tube; filaments short; anthers oblong. Hypogynous *disk* of 1—4 membranous scales, linear, free or joined below. *Ovary* sessile or subsessile, 1-celled; style very short; stigma large, capitate or globose. *Fruit* a fleshy or dry drupe, more or less included in the persistent base of the perianth; pericarp fleshy or membranous. *Seed* conform to the pericarp; testa crustaceous; inner testa, if present, membranous; albumen 0 or very scanty; cotyledons fleshy, plano-convex.—DIS-

TRIB. About 20 species, in Tropical and Eastern Asia, Australia and the Pacific Islands.

- Leaves subcoriaceous, 2—4 cm. long, 1—1.5 cm. broad;
 inflorescence terminal, under 1 cm. long .. 1. *W. VIRIDIFLORA*.
 Leaves submembranous, 3—9 cm. long, 1.5—3 cm.
 broad; inflorescence axillary, 1—2 cm. long or more 2. *W. CANDOLLEANA*.
 Leaves membranous, 5—13 cm. long, 2.5—4.5 cm.
 broad; inflorescence terminal, very short .. 3. *W. RIDLEYI*.

1. *WIKSTRÆMIA VIRIDIFLORA*, Meissn. in Denkschr. Regensb. Bot. Gesellsch. III. 206 (1841). A glabrous shrub; branchlets slender, dark brown, inner bark fibrous. *Leaves* opposite or subopposite, decussate, subcoriaceous; oblong or obovate, rounded at apex, cuneate at base; both surfaces reddish-brown when dry; 2—4 cm. long, 1—1.5 cm. broad; main nerves about 8—10 pairs, oblique, slender, irregular and often branched; petiole very short, 1—2 mm. long. *Flowers* in short few-flowered terminal spikes or fascicles, scarcely 1 cm. long. *Perianth-tube* 5—10 mm. long, glabrous, greenish-yellow, contracted at the mouth; lobes rounded, 2 mm. long, spreading. *Disk* of 2 or 4 slender scales, scarcely 1 mm. long, united in pairs. *Drupe* 6—7 mm. long, ovoid, scarlet. *Seed* acute at both ends; cotyledons thick. Meissn. in DC. Prodr. xiv. 2. 546; Benth. Fl. Hongk. 297; Miq. Fl. Ind. Bat. I. 1. 897; Prain Beng. Plants 906. *W. indica*, C. A. Mey. in Bull. Acad. Sc. Petersb. I. 357 (1843) var. *viridiflora*, Hook. f. Fl. Br. Ind. V. 195. *Daphne viridiflora*, Wall. Cat. 1049. *Diplomorpha? viridiflora*, C. A. Mey. l.c. 358.

KEDAH: Langkawi small islands, *Curtis* 3693!. PENANG: Government Hill, *Curtis* 1426!; at Balik Pulau, *Ridley* 8023!; on hills. *Deschamps*!. SINGAPORE: *Lobb*. 326!.—DISTRIB. India, Burma, Philippines, China.

2. *WIKSTRÆMIA CANDOLLEANA*, Meissn. in DC. Prodr. xiv. 544 (1857). A shrub (*Wray*, *Curtis*, etc.) or small tree reaching 4—6 m. in height and 5—7.5 cm. diam. of stem (*Kunstler*); branches slender, dark, with fibrous bark; branchlets slender, terete, dark brown, enlarged at the nodes. *Leaves* submembranous, opposite; ovate or elliptic-ovate or lanceolate, long acuminate at apex, acute or obtuse at base; upper surface dull, reddish-brown when dry, lower paler; margins recurved; 3—9 cm. long, 1.5—3 cm. broad; main nerves 8—12 pairs, irregular, prominent beneath, often branched; secondary nerves many, similar to the main nerves; reticulation rather obscure;

petiole very short, scarcely 1—2 mm. long. *Flowers* in axillary racemes, 1—2 cm. long, puberulous, gradually elongating, on slender peduncles 1 cm. long; pedicels very short, pubescent; flowers yellow or white, many, those not fruiting leaving prominent scars. *Perianth* tube slender, 6—8 mm. long; lobes 2—3 mm. long, alternately long and short, obtuse, incurved, glabrous. Hypogynous *disk* of 4 oblong scales, connected in pairs, 1—2 mm. long. *Ovary* ovoid, glabrous; style slender; stigma globose, papillose. *Drupe* ovoid, red, glabrous, 7 mm. long. Miq. Fl. Ind. Bat. I. 1. 879.

KEDAH: on Kedah Peak, *Ridley* 5482!. KELANTAN: at Campora, *Ridley*!. PERAK: at Gunong Batu Pateh, Gunong Bubu and Gunong Mas, at 1300—1500 m., *Wray* 204!, 3834!, 4136!; tops of hills at 1200—1300 m., *King's Collector* 2340!, 6985!; at Gunong Bubu, etc., *Scortechini* 336!, 792!; at Gunong Hijan 1800 m., *Curtis* 2055!, *Ridley* 2900!. PAHANG: at Kluang Terbang and Bukit Setampat Telom, etc., *Ridley* 10904!, 13705!, 13796!, 16092!.—DISTRIB. Java, Madura. The alpine specimens have smaller and more reddish leaves than those from lower levels.

3. WIKSTROMIA RIDLEYI, Gamble in Kew Bull. 200. (1912). A small shrub; branchlets slender, dark brown, terete, the uppermost puberulous, the nodes prominent. *Leaves* opposite, membranous; lanceolate, rather obtusely acute at apex or almost acuminate, acute at base or somewhat rounded; both surfaces olive-brown when dry, smooth, shining, glabrous; 5—13 cm. long, 2.5—4.5 cm. broad; midrib slender; main nerves about 8—10 pairs, obscure, irregular, oblique, with intervening occasional secondary nerves; reticulation obscure; petiole very short, 2—3 mm. long. *Flowers* yellow, in terminal few-flowered (5—6) fascicles, on peduncles about 5 mm. long; pedicels very short, pubescent. *Perianth*-tube slender, elongate, up to 10 mm. long, glabrous; lobes ovate, 4 mm. long, subequal. *Stamens* inserted below the throat of the tube, the two rows 2—3 mm. apart; filaments very short; anthers oblong, 1.5 mm. long. Hypogynous *disk* of 4 linear lobes, in two combined pairs, 1—2 mm. long, hyaline. *Ovary* obovoid, hirsute at apex; style slender; stigma large, papillose. *Drupe* with red fleshy pericarp, 6—7 mm. long, 5 mm. in diam. *Seed* with crustaceous outer and membranous inner testa; cotyledons very fleshy.

TRINGGANU: at Pulo Katam, *Ridley*!. PAHANG: at Pekan and Kwala Brawas, *Ridley* 1583!. (all in Herb. Singap.).

3. LINOSTOMA, Wall.

Erect or climbing shrubs. *Leaves* opposite or subopposite, pinninerved. *Flowers* hermaphrodite, in small paniced sometimes umbelliform cymes; bracts 2, on the peduncle, subopposite, leafy, at length enlarged and membranous. *Perianth*-tube cylindric, the base at length turgid; lobes 5, spreading; scales 10, inserted on the mouth of the tube above the stamens, free or connate in pairs. *Stamens* 10, inserted at the mouth of the tube, sometimes alternately long and short; filaments slender, exerted, broadening above into the connective; anthers ovoid or oblong, obtuse, dehiscing longitudinally, the cells enclosing the broadened connective. Hypogynous *disk* 0, or of a short lobed ring surrounding the base of the ovary-stalk. *Ovary* stipitate, long-hirsute, ovoid or oblong; style filiform; stigma capitate, penicillate; ovule 1. *Fruit* ovoid or globose included in or supported on the more or less cleft inflated base of the perianth-tube; pericarp red, crustaceous. *Seed* conform to the pericarp; testa membranous; albumen 0; cotyledons large, hemispheric, fleshy.—DISTRIB. Species 6, 3 in India and Malaya, 3 in S. America.

LINOSTOMA PAUCIFLORUM, Griff. in Calc. Journ. Nat. Hist. iv. 234 *in note* (1844). An erect or scandent shrub; branchlets long, slender, black when dry. *Leaves* opposite, chartaceous, glabrous; elliptic or obovate, obtuse or retuse and mucronate at apex, rounded or nearly acute at base; lower surface almost glabrous; margin entire, thickened from being closely reflexed; 2.5—5 cm. long, 1.5—2.5 cm. broad; main nerves very numerous, often nearly 50 pairs, at from 70°—90° with the midrib, parallel, ending in the margin; secondary nerves also numerous; reticulation obscure; petiole slender, up to 3 mm. long. *Cymes* terminal or axillary, few- (2—4-) flowered supported by pairs of leafy, white, ovate or ovate-oblong, floral leaves, thinner than and with fewer nerves than the regular leaves, reaching 4 cm. long by 2 cm. broad; peduncles filiform, glabrous; pedicels slender; flowers greenish-white. *Perianth*-tube slender, glabrous on both surfaces, somewhat constricted at mouth, 10-nerved, 1—2 cm. long; lobes 5 imbricate, 2 outer narrower than 3 inner, linear-oblong, 8—10 mm. long; scales clavate, crenulately rugose, about 5 mm. long. *Stamens* nearly as long as the corolla-lobes, the connective broadened and decurrent into the filament. *Disk* annular, lobed. *Fruit* enclosed in the slightly cleft, urceolate, enlarged, 10-ridged perianth-tube nearly 1.5 cm. long, pericarp glabrous, crustaceous. *Seed*

globose, 6—7 mm. in diam., testa membranous. Walp. Ann. I. 587; Meissn. in DC. Prodr. xiv. 2. 600; Kurz in Journ. As. Soc. Beng. xxxix. ii. 83 and in For. Fl. II. 334; Miq. Fl. Ind. Bat. I. i. 882; Hook. f. in Fl. Br. Ind. V. 198. *Psilœa dalbergioides*, Miq. Fl. Ind. Bat. Suppl. 355.

KEDAH: Langkawi island, *Curtis*!. PENANG: *Curtis* 713!. DINDINGS: Pangkore, *Scortechini* 983!; *Ridley* 8017!; at Lumut, *Ridley* 10289!. SINGAPORE: near Stativa, *Griffith* 4376!; *Maingay* 1308/3!; Bukit Timah, *Goodenough*!; Changi Soyang, *Ridley* 1858!.—DISTRIB. Burma (*Kurz*); Sumatra (Sibogd, West Coast, *Teysmann*!).

4. ENKLEIA, Griff.

Scandent shrubs. *Leaves* alternate or subopposite, penni-nerved. *Flowers* hermaphrodite, in terminal capitula on the branches of an elongated terminal panicle, each branch bearing bracts and two floral leaves, the said leaves usually small and bractiform, but in fruiting branches large, leafy, chartaceous, coloured and reflexed with the upper side downwards on thickened petioles. *Perianth*-tube tubular-ovoid, constricted below the throat; lobes 5, short, erect and incurved; scales 5, short, bifid or bilobed, behind the stamens on the throat of the perianth-tube. *Stamens* 10, in two rows on the upper part of the perianth-tube, the upper 5 just below the throat, the lower 5 a little below; filaments short, slightly broadening under the anthers; anthers 2-celled, the cells parallel, introrse, the connective not broadened. Hypogynous *disk* 0, or a very minute glabrous ring at the base of the ovary. *Ovary* sessile, ovoid; style short; stigma oblong, papillose; ovule 1, pendulous. *Fruit* a drupe supported at the base by the cleft remains of the perianth; pericarp woody. *Seed* conform to the pericarp; testa soft, sub-membranous; albumen 0; cotyledons fleshy, hemispheric.—DISTRIB. One species, perhaps another in the Andaman Islands.

ENKLEIA MALACCENSIS, Griff. in Calc. Journ. Nat. Hist. iv. 234 *in note* (1844). A climbing shrub with brown bark and decurved branches; branchlets, inflorescence and undersurface of leaves softly ferruginous-tomentose. *Leaves* alternate or subopposite, coriaceous; elliptic to suborbicular, broadly acute, rounded or retuse and mucronate at apex, obtuse or obtusely acute at base; upper surface dull, olivaceous when dry, lower softly tomentose; margin entire, thickened; 5—10 cm. long, 4—7 cm. broad; midrib stout, tomentose on

both surfaces, prominent beneath; main nerves about 15—20 pairs, at from 70°—80° with the midrib at first then arched to the margin; transverse nervules subparallel, oblique; reticulation obscure; petiole 8—12 mm. long, tomentose. *Panicles* elongate, up to 25 cm. long, 15 cm. broad; bracts small, near the bases of the branches; floral leaves of two kinds, the smaller linear-oblong 6—12 mm. long, the larger on fruiting branches leaf-like, pale brown, oblong-obovate, obtuse at apex and base, prominently nerved and reticulate, deflexed, the upper surface usually lowest, 5—6 cm. long, about 2 cm. broad, the petiole thick on a thickened base; heads terminal, subumbellate; bracteoles minute; buds clavate; flowers greenish-brown. *Perianth*-tube tubular-ovoid, constricted above, densely rusty-tomentose without, glabrous within, 5—6 mm. long; lobes short, 2—3 mm. long, incurved, villous within; scales 5, minute, obtuse, bilobed or bifid, glabrous. *Stamens* very small, filaments short, anthers oblong. *Ovary* densely white hirsute; style very short; stigma capitate. *Drupe* ovoid, prominently ribbed and reticulate, 12—15 mm. long, 1 cm. broad, beaked; pericarp woody; remains of perianth at base only; pedicel thickened. *Seed* subglobose, 6 mm. in diam.; testa softly membranous; cotyledons hemispheric; radicle rather large, acute. Walpers Ann. I. 588; Engl. & Prantl Naturl. Pflanzenfam. III. 6A. 231. *E. malayana*, Griff. Notul. IV. 363. *Lasiosiphon scandens*, Endl. Gen. Pl. Suppl. IV. Part 2. 67 (1847); Meissn. in DC. Prodr. xiv. ii. 598. *Linostoma scandens*; Kurz in Journ. As. Soc. Beng. xxxix. ii. 83 (1875) and For. Fl. II. 334; Miq. Fl. Ind. Bat. I. 1. 881; Hook. f. in Fl. Br. Ind. V. 198. *L. siamense*, Kurz l.l.c. *vide* Hook f.

MALACCA: *Griffith* 4375; at Ayer Punas, *Curtis* 3493!; at Sungei Udang, *Goodenough* 1674!; *Alwis*!. SINGAPORE: *Maingay* 1308.2!; *Schomburgk* 101!; in experimental garden, *Ridley* 5565!, at Bukit Timah, *Ridley* 6427!.—DISTRIB. Burma and Siam (*Kurz*).

5. AQUILARIA, Lamk.

Trees. *Leaves* alternate, penni-nerved, glossy. *Flowers* hermaphrodite, pedicellate, in axillary or terminal peduncled umbellules, ebracteate. *Perianth* tube campanulate; lobes 5, spreading or reflexed; scales 10 on the throat of the perianth, densely pilose, connate below in a short ring. *Stamens* 10, alternate with the scales and below them; filaments short; anthers oblong, introrse, the cells often unequal. *Ovary* sessile, densely villous, 2-celled; style very

short; stigma large, capitate, papillose; ovules 2, pendulous. Hypogynous disk 0, or a very minute ring. *Fruit* a compressed obovate or oblanceolate 2-celled capsule, loculicidal; pericarp coriaceous or woody; placentas on the middle of the valves. *Seeds* 2 or 1 by abortion, ovoid, the base of each bearing a long caudiform appendix reaching to the bottom of the cell; testa crustaceous, tegmen soft, corky; albumen 0; cotyledons fleshy, plano-convex.—About 10—12 species, in India, Malaya, China and the Philippines to New Guinea.

Leaves glabrous, shining, under 10 cm. long; perianth

5 mm. long, puberulous; capsule obovoid, glabrous,

under 3 cm. long 1. *A. MALACCENSIS*.

Leaves puberulous beneath, dull, usually over 10 cm.

long; perianth 8—10 mm. long, grey-tomentose;

capsule oblanceolate, grey-tomentose, 4 cm. long .. 2. *A. HIRTA*.

1. *AQUILARIA MALACCENSIS*, Lamk. Dict. I. 49 (1783) and III. t. 356. A large tree reaching 18 to 24 m. in height and 60 cm. in diam. of stem; bark whitish, rather smooth; branchlets slender, pale brown. young ones pubescent; buds silky. *Leaves* chartaceous, glabrous; oblong-lanceolate or shortly oblong, acutely or obtusely caudate-acuminate at apex, rounded or attenuate at base; both surfaces shining, smooth; margins wavy, recurved and thickened; 6—10 cm. long, 2.5—4.5 cm. broad; main nerves 8 to 12 pairs, rather irregular, often branched, curving to the thickened margin and with secondary nerves between, also many very fine subparallel nervules; petiole thickened, 4—6 mm. long. *Umbellules* on axillary or lateral branchlets, about 6-flowered; peduncles 6—10 mm. long; pedicels slender, 3—4 mm. long. *Perianth*-tube campanulate, puberulous without, nearly glabrous and 10-ribbed within, 3 mm. long; lobes ovate, 2 mm. long, villous, reflexed in flower; scales 10, obtuse, densely pilose, 1 mm. long. *Stamens* below the scales, the anthers about as long. *Ovary* densely villous; style short; stigma capitate. *Capsule* broadly obovoid or oblanceolate, 2.5—3 cm. long, 2—2.5 cm. broad; pericarp woody, smooth outside or warted. *Seeds* ovoid, puberulous, beaked, 6—7 mm. long, the basal appendage as long and twisted. DC. Prodr. II. 59; Meissn. in DC. Prodr. xiv. 2. 602 *excl. citation of Benth.*; Dict. Sc. Nat. t. 248; Kurz For. Fl. II. 236; Miq. Fl. Ind. Bat. I. 1. 883 and Suppl. 356; Hook. f. Fl. Br. Ind. V. 200; Baillon Hist. des Pl. VI. 100, figs. 67—69; Gilg in Engl. & Prantl Naturl. Pflanzenfam. III. 6A. 224, Fig. 77B; Ridl. in Journ. R. As. Soc. Straits Br. xxxv. 73; Koord. Exkurs. Fl. Jav. 656. A.

ovata, Cav. Diss. VII. 377, t. 334. 'Agallochum Secundarium' Rumph. Herb. Amb. II. 34, t. 10.

PENANG: Government Hill and Waterfall, *Curtis* 1534!; Balik Pulau, *Ridley*!. PERAK: in hilly forest near Larut at 150 to 250 m. alt., *King's Collector (Kunstler)* 3569!; *Scortechini*!. PAHANG: at Kwala Luit, *Ridley* 2581!. MALACCA: *Griffith* 4382!; *Maingay* K.D. 553!, 1317!; at Brisu, *Derry* 1151!; at Sungei Udang, Bukit Bruang and Bukit Tampin, *Goodenough* 1355!, 1424!, 1873!; Bukit Sulu, *Alwis* 1600!. JOHORE: at Castlewood, *Ridley*!. SINGAPORE: Kranji and Garden jungle, *Ridley* 6375!.—DISTRIB. Burma? (*Kurz*); Sumatra, Bangka (*Teysmann*), Java. Vern. 'Garu.'

2. *AQUILARIA HIRTA*, *Ridley* in Journ. R. As. Soc. Straits Br. xxxv. 73 (1901). A small tree reaching 30 ft. in height; branchlets pale brown, rough, uppermost tomentose; leaf-buds lanceolate, white-silky. *Leaves* subcoriaceous; elliptic or elliptic-ovate, acuminate and mucronate at apex, obtusely acute or rounded at base; both surfaces olivaceous when dry, the lower paler, upper glabrous, lower puberulous especially when young; margin recurved and thickened; 8—18 cm. long, 3—6 cm. broad; midrib rather stout, usually impressed above, tomentose beneath; main nerves numerous, 20—30 pairs, irregular, sometimes branched, nearly straight to the thickened margin and with secondary nerves between, also many very fine subparallel horizontal nervules; petiole thickened, 5—7 mm. long, curved. *Umbellules* on axillary branchlets or subterminal, 8—10-flowered, densely grey-tomentose; peduncles short, slender, 5—10 mm. long; pedicels slender, 5—6 mm. long; buds clavate, 1 cm. long at time of opening. *Perianth*-tube cylindrical, 8—10 mm. long, densely tomentose without, ribbed and sparsely villous within; lobes ovate, 4 mm. long, villous on both surfaces, erect in flower and fruit; scales 10, very small, ovate, densely pilose. *Stamens* below the scales, the anthers twice as long as them. *Ovary* clavate, densely villous; style short, slender; stigma conical-capitate, bifid. *Capsule* densely-olive-grey tomentose without, oblanceolate, somewhat acute at apex, much narrowed at base and supported by the persistent somewhat enlarged perianth, 4 cm. long, 1—1.5 cm. broad; pericarp leathery. *Seeds* ovoid, glabrous, beaked, 1 cm. long, the basal appendage half as long again; testa crustaceous, black, shining.

JOHORE: at Bukit Pengaram, *Ridley* 11020!, *Murton* 2!. SINGAPORE: at Bajan, *Goodenough* 3837!. Vern. 'Chandan.'

Family CV *bis* GONYSTYLACEÆ.

Trees. *Leaves* alternate, evergreen, penni-nerved. *Flowers* hermaphrodite, in short racemes or umbels in axillary or terminal panicles; buds globose. *Perianth* short, cupshaped, 5-cleft, thickly coriaceous, hirsute within, with a ring of elongated setaceous curved scales at the base within. *Stamens* many at the base of the perianth; filaments short; anthers basifixed, elongate, 2-celled, the cells rounded over the top. *Ovary* 4—6-celled; ovules solitary in each cell, pendulous, anatropous; style filiform, geniculate-flexuose; stigma clavate. *Fruit* a subglobose, irregularly loculicidally dehiscent capsule; pericarp very thick. *Seeds* usually 1—2 only, globose or oblong, pendulous; testa crustaceous, tegmen membranous; albumen 0; cotyledons large, fleshy, plano-convex; radicle minute, superior.—DISTRIB. One genus.

This Family was described by Gilg in Engl. & Prantl *Naturl. Pflanzenfam. Nachtr.* 231 (1897) to receive the genus *Gonystylus* which had been placed in *Thymelæaceæ* by previous authors. It comes, according to Gilg, just before *Tiliaceæ* but is *Monochlamydeous*.

1. GONYSTYLUS, Tevsm. and Binn.

Characters of the Family.—DISTRIB. Malay Peninsula and Archipelago, 7 species.

GONYSTYLUS MAINGAYI, Hook. f. in *Fl. Br. Ind.* V. 200 (1886). A large tree reaching 18 to 24 m. in height and 45 to 60 cm. in diam. of stem; branches woody with black smooth bark wrinkled when dry; branchlets moderately thick, young ones and inflorescence finely grey-pubescent. *Leaves* chartaceous; elliptic-oblong or oblong-lanceolate, somewhat abruptly obtusely cuspidate-acuminate and mucronate at apex, rounded or cuneate at base; both surfaces shining, olive-brown when dry, upper glabrous, lower black-glandular, glabrous or slightly puberulous especially on the midrib; margin thickened; 10—20 cm. long, 4—7 cm. broad; midrib stout, prominent beneath, slightly impressed above; main nerves about 20 pairs, starting at about 70° with the midrib and curved to join in an arched intramarginal nerve; secondary nerves many, parallel, branched to join the main nerves in a raised reticulation; petiole stout, rugose, puberulous, 1—2 cm. long. *Panicles* terminal, densely and finely grey-pubescent, 8—12 cm. long; branches short, about 1 cm. long; racemes subumbellate, 3—6-flowered; pedicels straight, 1—2 cm.

long; buds globose, about 5 mm. in diam. *Perianth* thick, densely villous with stiff hairs within; lobes 5, unequal; scales subulate, often bifid, black when dry, 2—3 mm. long, about 15 to 20 in number in a ring a little above the bases of the lobes. *Stamens* about as many as the scales and within them; filaments very slender, short; anthers 1 mm. long, oblong. *Ovary* densely villous without, usually 4-celled in a cross; style very long, twisted; ovules flattened. *Capsule* large, globose, obovoid or ellipsoid-oblong, 4—6 cm. long, 2.5 to 4 cm. in diam.; pericarp very thick and woody, the 2—4 valves of transverse woody fibres, the surface rough, pitted. *Seeds* 1—4, usually 1 or 2, globose or oblong; testa crustaceous; cotyledons very fleshy, 2—3 cm. in diam. Gilg in Engl. & Prantl Naturl. Pflanzenfam. Nachtr. 232; Ridl. in Journ. R. As. Soc. Straits Br. xxxv. 89 (1901).

PENANG: Government Hill, *Curtis* 1509!, 3036!; at Balik Pulau, *Ridley* 9399!. PERAK: at Tapa, *Wray* 1252!; at Goping, *Scortechini* 1957!; near Larut, *King's Collector* 3703!, 3778!, 6925!, 7478!, 7592!, 7752!. MALACCA: *Maingay* K.D. 1441!. SINGAPORE: Garden jungle, *Ridley* 6186!; Bukit Mandai, *Ridley* 6719!; at Chua Chu Kang, *Ridley* 6719a!.

The great mass of available material shows considerable variation, to some extent in the leaves, but especially in the size of the fruit. But I have tried in vain to arrange it in varieties and must come to the same conclusion as *Ridley* did. In his 'Notes on the Flora of Singapore' in the Journal of the Straits Br. R. As. Soc. he has pointed out that 'the fruit in Herbarium specimens often splits before it is ripe.' He clearly considers that the Peninsular material, of which the Singapore Herbarium has a great series of specimens, all belongs to one species, and I have thought it right to follow him and describe it accordingly. The type is *Maingay's* 1441, the leaves of which are more reddish-brown and slightly more pubescent beneath than most of the other material, but I can find no other difference.

Family CVI. ELÆAGNACEÆ.

Trees or shrubs with copious silvery or brown scales. *Leaves* alternate or opposite, quite entire, exstipulate. *Flowers* small, regular, hermaphrodite or dicecious, in axillary fascicles, spikes or racemes; bracts small, deciduous. *Perianth* in hermaphrodite or ♀ flowers tubular, constricted above the ovary, persistent below, deciduous above, limb 2—4-lobed; in ♂ sometimes of 2 membranous lobes. *Stamens* in hermaphrodite flowers adnate to the throat of the perianth-tube, as many as the lobes and alternate with them, in ♂ flowers

adnate to the base of the perianth and twice as many as the lobes; filaments free, short, anthers oblong, 2-celled, the cells parallel, dehiscent longitudinally. *Ovary* free, 1-celled; style filiform, stigma lateral; ovule 1, basal, erect, anatropous. *Fruit* a nut, closely covered by the thickened perianth base; pericarp membranous. *Seed* erect; testa crustaceous or hardened; albumen scanty or 0; cotyledons thick, fleshy; radicle inferior.—DISTRIB. North temperate and tropical regions: genera 3, species about 16.

1. ELÆAGNUS, Linn.

Trees or shrubs, with silvery or stellate scales. *Flowers* hermaphrodite, axillary, solitary or in fascicles or racemes. *Perianth-tube* campanulate or funnel-shaped, narrowed above the ovary; lobes 4, valvate, deciduous. *Stamens* 4, on the mouth of the perianth on a prominent ring, alternate with the lobes. *Ovary* 1-celled, style linear, stigma lateral. *Fruit* a nut, closely covered with the thickened perianth-base.—DISTRIB. S. Europe, temperate and tropical Asia, Australia, N. America; species 12.

ELÆAGNUS LATIFOLIA, Linn. Sp. Pl. 121 (1753). A large climbing shrub, with thick stem; branches stout, spinescent; branchlets rough, covered, like the leaves beneath and inflorescence, with rust-coloured, shining, peltate scales. *Leaves* variable, membranous to coriaceous; elliptic or elliptic-lanceolate, obtuse, acute or acuminate at apex, acute to almost rounded at base; upper surface pale green with scattered silvery scales when young, lower surface silvery, scaly when young, rusty brown when older; 5—10 cm. long, 3—5 cm. broad; midrib slender; main nerves 5—7 pairs, curving to near the margin and then joining in loops; reticulation rather obscure; petiole slender, 1—1.5 cm. long. *Flowers* ♂ or ♀, many, greenish or yellowish-white, in axillary fascicles or racemes up to 2 cm. long, the rachis lengthening and rugose with the scars of fallen flowers and bracts; bracts boatshaped, curved, caducous, 1—2 mm. long; pedicels short. *Perianth-tube* campanulate, 5—10 mm. long; lobes ovate, acute, 2—3 mm. long, spreading; anthers oblong, 1 mm. long; style hirsute towards the base. *Fruit* ellipsoid-oblong, 1—2 or more cm. long, crowned with the top of the perianth, orange or red with white spots, densely scaly, prominently 8-ribbed when dry; mesocarp succulent, edible; endocarp densely felted. *Seed* oblong; testa shining; cotyledons thick, fleshy; radicle pointed, small. Schlecht. in DC. Prodr. xiv. 610; Wight Ic. t. 1856; Wall. Cat. 4028; Bl. Bijdr. 637;

Brandis For. Fl. 390, t. 46 and Ind. Trees 547; Bedd. Fl. Sylv. Man. t. xxv, fig. 1; Trimen Fl. Ceyl. III. 461; Prain Beng. Pl. 908; Cooke Fl. Bomb. II. 543; Hook. f. Fl. Br. Ind. V. 202; Koord. Exkurs. Fl. Jav. II. 658. *E. conferta*, Roxb. Fl. Ind. I. 440 and Ed. Carey and Wall. I. 460; Kurz For. Fl. II. 331; Schlecht. in DC. l.c. 612. *E. arborea*, Roxb. ll.c. 441 and 461; Schlecht. l.c. 611; Wall. Cat. 4027. *E. ferruginea*, A. Rich. Monog. Elæagn. 387, 404; Schlecht. l.c. 610; Miq. Fl. Ind. Bat. I. 1. 980; Wall. Cat. 4029. *E. Thwaitesii* and *Wallichiana*, Schlecht. l.c. 611, 612. *E. Kologa*, Schlecht. l.c. 611; Dalz. and Gibs. Bomb. Fl. 224.

PENANG: *Maingay* K.D. 1312!; at Government Hill, 750 m., *Curtis* 904!; *Ridley*!; *King's Collector* 5214!.—DISTRIB. India, Ceylon, Malay Archipelago, China.

Ridley says that the plant is only introduced and run wild in Penang, but in view of its wide distribution in India and the Archipelago, it seems best to describe it here.

Family CVIII. SANTALACEÆ.

Trees, shrubs or herbs, many being parasitic or semi-parasitic on the branches or roots of other plants. *Leaves* alternate or opposite, entire, sometimes scale-like or 0, exstipulate. *Inflorescence* various; flowers inconspicuous, usually bracteate and bracteolate, regular, 1—2-sexual. *Perianth* superior or partly inferior, 3—8-lobed—toothed or -partite. *Stamens* as many as and opposite to the perianth lobes, attached to or above the perianth-base; anthers 2-celled. *Disk* epigynous or perigynous. *Ovary* 1-celled, inferior; ovules 2—3, adnate to or pendulous from a central column; style short; stigma entire or 3—6-lobed. *Fruit* a nut or drupe. *Seed* globose or ovoid, rugose or sulcate; testa thin or wanting; albumen copious, fleshy: embryo usually terete; radicle superior.—DISTRIB. About 240 species, in temperate and tropical regions; genera about 23.

Erect or climbing, usually parasitic shrubs; flowers minute, in short racemes; drupe small 1. HENSLOWIA.
 Trees, often spiny; flowers in short catkin-like spikes; drupe large 2. SCLEROPYRUM.
 Genus to be transferred to Opiliaceæ—CHAMPEREIA.

1. HENSLOWIA, Blume.

Parasitic shrubs with spreading, erect or twining branches. *Leaves* alternate, petiolate, thickish. *Flowers* very minute, monœ-

cious or dioecious, the ♂ in fascicles of cymes or capitula from the axils of the leaves, the ♀ or ♂ solitary or in small clusters. *Perianth-tube* of ♂ 0, of ♀ adnate to the ovary, globose, ovoid or oblong; lobes 5—6, valvate. *Stamens* 5—6, inserted at the base or middle of the lobes and opposite to them, in ♀ none or reduced to staminodes, in ♂ as in ♀; filaments short, thick; anthers introrse, didymous, dehiscing by a transverse slit. *Disk* concave or convex, epigynous. *Ovary* inferior, 1-celled; ovules 2—4, suspended from the apex of a free central placenta; stigma subsessile, discoid or lobed. *Drupe* ovoid, obovoid or subglobose; exocarp fleshy; endocarp hard, often bony, protruded within in 5—10 vertical sinuous hard plates into fissures in the stellately-lobed seed. *Seed* with long funicle and much-lobed albumen; embryo central; cotyledons linear or oblong, usually shorter than the superior radicle.—**DISTRIB.** About 20 or more species, Indian, Malayan and Chinese.

- Drupe large, reaching 13 mm. long, 9 mm. broad;
leaves coriaceous, broadly obovate or orbicular,
pedately 5-ribbed; racemes up to 2 cm. long .. 1. *H. RIDLEYI*.
- Drupe medium-sized, 8—10 mm. long, 6—8 mm. broad.
Leaves subcoriaceous, elliptic or obovate, 3-
pedately 5-ribbed; racemes up to 7—12 mm. long;
drupe 5-furrowed 2. *H. VARIANS*.
- Leaves coriaceous, elliptic, obovate or oblanceolate,
sometimes orbicular, 3-ribbed; racemes 5—7 mm.
long; drupe smooth 3. *H. WRAYI*.
- Leaves coriaceous, ovate, obtuse at apex, 9-ribbed;
racemes 20 mm. long; drupe obscurely furrowed 4. *H. PLURINERVIS?*
- Drupe small.
- Drupe globose, 5 mm. in diam., obscurely 5-fur-
rowed; leaves coriaceous, obovate to orbicular, 3-
or pedately 5-ribbed; racemes 6 mm. long .. 5. *H. LOBBIANA*.
- Drupe globose, 3 mm. in diam.
Drupe 4—6-furrowed; leaves subcoriaceous, el-
liptic or obovate, usually small, 3—5—7-ribbed
but not channelled; flowers from a tubercle,
nearly sessile 6. *H. BUXIFOLIA*.
- Drupe obscurely furrowed; leaves coriaceous,
obovate, obtuse and emarginate, 3- or pedately
5-ribbed, the ribs in channels; flowers in fascicles
of short racemes 7. *H. MONTICOLA*.

1. *HENSLOWIA RIDLEYI*, Gamble in Kew Bull. 201 (1912). A climbing parasitic (?) shrub; branchlets stout, nearly black when dry. *Leaves* coriaceous; broadly obovate or orbicular, rounded and sometimes slightly emarginate at apex, abruptly narrowed at base into

the petiole; both surfaces glabrous, the upper shining, the lower ferruginous-brown, sometimes puncticulate; margin slightly recurved; 2—5.5 cm. in diam.; ribs primarily 3, the 2 outer pedately branching early to make 5, curved to join in faint loops at the apex; main nerves none, transverse nervules and reticulation irregular, obscure; petiole 1—2 cm. long, rather slender below, above gradually broadened to the blade. *Flowers* rather large (for the genus) in slender few-flowered racemes up to 2 cm. long, fascicled in the axils of the leaves; bracts small, deciduous. *Perianth* tube in ♂ very short, lobes 5—6, triangular, 1.5 mm. long; in ♀ enclosing the ovary, lobes rather shorter than in ♂, persistent. *Disk* concave, ♂ apiculate only in the centre, ♀ with the lobed stigma. *Drupe* rather large, obovoid, about 13 mm. long, 9 mm. broad, exocarp furrowed, slightly rugose and with many irregular protuberances into the albumen within.

SELANGOR: Sempang mines, *Ridley* 15568!. PAHANG: at Kluang Terbang, *Barnes*!; at Gunong Tahan, 1500—1800 m. alt., *Wray and Robinson* 5484?!

2. *HENSLOWIA VARIANS*, Blume Mus. Bot. Lugd.-Bat. I. 244. t. xliii (1850). A climbing parasitic shrub reaching 4—6 m. in length; branches terete, nearly smooth, nodose and somewhat angular. *Leaves* subcoriaceous; elliptic or obovate, obtuse or rounded at apex, narrowed at base; both surfaces glabrous, the upper shining, the lower sometimes puncticulate, olive-green when dry; margins reflexed; 4—9 cm. long, 2—6 cm. broad; ribs usually 3, sometimes 5 by the bifurcation of the outer ones, sometimes with a pair of inconspicuous ones near the margin, all curving to anastomose near the apex; nerves very few, irregular and irregularly netted; petiole 3—10 mm. long, the upper part bordered by the decurrent margins of the blade. *Flowers* minute; ♂ in fascicles of racemes 7—12 mm. long in the axils of the leaves, bracts minute, caducous, buds depressed, concave at top; pedicels short, 1—2 mm. long; ♀ also fascicled but the racemes fewer. *Perianth*-tube very short in ♂, the lobes triangular, 1—1.5 mm. long, minutely recurved-apiculate; in ♀ surrounding the ovary, the lobes persistent in fruit. *Disk* in ♂ flat or slightly concave, 2.5 mm. in diam.; in ♀ surrounding the 5-lobed stigma. *Drupe* ellipsoid-globose, 8—10 mm. long, 6—7 mm. broad, rugose, the endocarp 5-furrowed; cotyledons usually shorter than the radicle. A. DC. Prodr. xiv. 631; Hook. f. Fl. Br. Ind. V. 233; Brandis Ind. Trees 554. *Dendrotrophe varians*, Miq. Fl. Ind. Bat. I. 1. 780.

TRANG: *Kunstler* (*King's Collector*) 1386!. KEDAH: at Coah, *Curtis* 2593!. PENANG: on Penang Hill, *G. King*!. PROVINCE WELLESLEY: at Tasik Glugur, *Ridley*!. DINDINGS: at Lumut, *Ridley*!; *Scortechini*!. PERAK: Larut at 240—300 m. alt, *King's Collector* 5213!. MALACCA: *Maingay* K.D. 1316/2!; at Bukit Bruang, *Ridley* 322!; at Pringgit, *Goodenough* 1675!; *Hullett* 640!. JOHORE: at Tanjong Kupang, *Ridley*!. SINGAPORE: at Chenchukang, *Goodenough*!; at Changi, *Ridley*!.—DISTRIB. Tenasserim (*Griffith* K.D. 4390!, 4392!), Borneo.

3. HENSLOWIA WRAYI, King M.S. in Herb. Calc.; Gamble in Kew Bull. 201 (1912). A climbing parasitic shrub reaching a considerable length (12—18 m., *Kunstler*); branchlets terete, slender, the older somewhat rough. *Leaves* coriaceous; elliptic, obovate or oblanceolate sometimes orbicular, obtusely acute or rounded at apex, acute or acuminate at base; both surfaces glabrous, dull, olivaceous when dry; margins recurved; 4—8 cm. long, 2—5 cm. broad; ribs 3, prominent, sometimes branched but rarely; nerves few, short, inconspicuous, chiefly outside the outer ribs; reticulation obscure; petiole rather thick, about 5 mm. long, gradually expanding into the blade. *Flowers* in short fascicles of racemes from the axils of the leaves or the scars of fallen leaves; ♂ slender, 3—4-flowered, 5—7 mm. long, with small ovate bracts on the rachis and below the flowers; ♀ racemes thicker, fewer-flowered; pedicels scarcely 1 mm. long. *Perianth-tube* in ♂ very short, lobes triangular, 5—1 mm. long, apex hooked; in ♀ enclosing the ovary, lobes as in ♂. *Disk* concave, 1 mm. broad; in ♂ with a minute apiculus, in ♀ with a 5-lobed stigma. *Drupe* ellipsoid-obovoid, 1 cm. long, 7.5 mm. broad; smooth, not ribbed, endocarp rugose; albumen much lobed.

PERAK: hilly country at 150—300 m., *King's Collector* 4214!, 10834! (type); at Sungie Larut and Relan Tujur, *Wray* 2279!, 4032!. MALACCA: *Goodenough* 1937!; *Hervey*!.

4. HENSLOWIA PLURINERVIS, Boerl. Handl. Fl. Néd. Ind. III. 181 (1900)? A climbing shrub; branchlets rounded, rather rough, nearly black when dry. *Leaves* coriaceous; ovate, obtuse at apex, narrowed at base into the broad petiole; both surfaces glabrous, upper somewhat shining, lower dull; margins recurved; 4—7 cm. long, 3—5 cm. broad; ribs about 9, usually starting from the base, but occasionally branched; main nerves none, transverse nervules and reticulation very obscure; petiole stout, broad, 5—10 mm. long,

gradually broadening into the blade. *Flowers* hermaphrodite (?) in racemes up to 2 cm. long, fascicled 2 to 3 together in the axils of the leaves. *Perianth*-tube enclosing the ovary; lobes 5, triangular, 1 mm. long, persistent in fruit. *Disk* slightly concave, 5-angled, with the 5-lobed stigma in the centre. *Drupe* suborbicular, 8 mm. long, 7 mm. broad, exocarp fleshy, the endocarp rugose, obscurely channelled, with many protuberances into the albumen within. *Dendrotrophe plurinervis*, Miq. Fl. Ind. Bat. I. 1. 1096?

PERAK: at Gunong Batu Pateh, 1300—1400 m. alt., Wray 278!.

—DISTRIB. Sumatra, *Teysmann*.

The description herein given is taken from Wray's specimens and the suggested identification was first made after reading Miquel's description of his *D. plurinervis* in the Fl. Ind. Bat. By the courtesy of the authorities at Kew, I was enabled to examine the type specimen, lent from the Herbarium at Utrecht, and the examination only confirms my doubt. The type specimen is poor indeed, consisting now of only slender branchlets and a few leaves in poor condition, the branchlets, which bear the appearance of having had suckers, are smoother and the leaves are rather thinner and more nearly orbicular than in Wray's specimen, but the agreement seems sufficiently close to make it undesirable at present to consider Wray's plant as a new species.

5. HENSLOWIA LOBBIANA, A. DC. Prodr. xiv. 631 (1857). A climbing parasitic shrub reaching 4—5 m. in length; branches usually rough, but often nearly smooth, sometimes striate, dark brown when dry, uppermost angular, nodose. *Leaves* coriaceous; broadly obovate to orbicular, rounded at apex, attenuate and almost cuneate at base; both surfaces glabrous, the upper shining, the lower dull and sometimes punctulate, usually dark brown when dry; margins reflexed; 2.5—6 cm. long, 2—4 cm. broad; ribs usually 3, the outer pair sometimes bifurcated; nerves very few, irregular and chiefly between the outer ribs and the margin; petiole broad, 4—6 mm. long, bordered by the decurrent margins of the blade. *Flowers* minute; ♂ in fascicles of racemes up to 6 mm. long in the axils of the leaves, bracts minute, caducous, buds clavate, convex at top, pedicels scarcely 1 mm. long; ♀ also in fascicled racemes but of few flowers, the floral bracts obovate, 2 mm. long; pedicels very short. *Perianth* tube in ♂ very short, in ♀ enclosing the ovary, the lobes persistent in fruit. *Disk* in ♂ flat or concave; in ♀ annular, thick, surrounding the columnar 5-lobed stigma. *Stamens* with the connective of the anthers produced in a rounded apiculus. *Drupe* globose, 5 mm. in diam., obscurely 5-furrowed and rugose; cotyledons

oblong, nearly as long as the radicle. Hook. f. Fl. Br. Ind. V. 233; Merr. in Philipp. Journ. Sc. I. Suppl. 50.

PENANG: *Lobb* 334!; Government Hill, *Maingay* K.D. 1315!; *Curtis* 1393, etc.!; *Ridley*!. PAHANG: at Praman and Katapang, *Ridley* 1239!. MALACCA: *Griffith*; *Maingay* K.D. 1313!. SINGAPORE: at Changi, *Ridley* 4697!, 4728!, 5909!; *Kunstler* (*King's Collector*) 1181!.—DISTRIB. Borneo (*Haviland* 84!), Philippine Islands.

6. *HENSLOWIA BUXIFOLIA*, Blume Mus. Bot. Lugd.-Bat. I. 224 (1850). A slender climbing parasitic shrub reaching 5--10 m. in length, sometimes trailing on the ground; the branches terete, wiry, dark brown. *Leaves* yellowish-green, subcoriaceous; elliptic or obovate, obtuse or obtusely acute at apex, narrowed at base, young ones often spatulate; glabrous on both surfaces and dull, the upper sometimes shining; 1--6 cm. long, 0.5--2 cm. broad; ribs 3, or 5 or 7 by the subdivision of the outer pair, the inner 3 only reaching to and joining at the apex; nerves rarely 1--2; reticulation obscure; petiole broad, 3--6 mm. long, bordered by the decurrent margins of the blade. *Flowers* minute, sessile, or very minutely pedicelled on the top of a peduncle scarcely 5 mm. long; ♂ very scarce, without bracts, ♀ bracteate at base; all from very short tubercles on the branchlets. *Perianth-tube* very short in ♂, the lobes triangular, under 1 mm. long, hooked at the apex; in ♀ surrounding the ovary, the lobes persistent in fruit. *Disk* in ♂ flat, 5-lobed; in ♀ concave with a minute 5-lobed stigma. *Drupe* dark red or purplish-black, globose, rugose, 3 mm. in diam.; endocarp 4--6-furrowed. A. DC. Prodr. xiv. 631; Hook. f. Fl. Br. Ind. V. 234. *Dendrotrophe buxifolia*, Miq. Fl. Ind. Bat. I. 1. 781. *Osyris rotundata*, Griff. Notul. N. 742 and Ic. Pl. Asiat. t. 627, f. 2.

KEDAH: at Kedah Peak, *Ridley*!. PENANG: at Polo Inajah, *Curtis* 477!. PERAK: at Larut, under 100 m. alt., *King's Collector* 4179!. TRINGGANU: at Bundi, *Ridley*!. PAHANG: at Kluang Terbang, *Barnes* 10908!; at Praman Pekan, *Ridley* 3!, 89!. MALACCA: in littoral woods, Tanjong Cling, *Griffith* K.D. 4391!; *Cuming* 2366; at Gunong Mering, *Ridley* 3159!. JOHORE: at Tanah Runto, *Goodenough* 3381!; top of Bukit Pengaram, *Ridley* 11032!. SINGAPORE: at Kranji, Bajan, etc., *Ridley*!.—DISTRIB. Bangka (*Teysmann*) Borneo.

7. *HENSLOWIA MONTICOLA*, Gamble in Kew Bull. 201 (1912). A parasitic shrub; branchlets smooth, angular, striate, nearly black.

Leaves coriaceous; obovate-spathulate, very obtuse and emarginate at apex, acuminate at base; both surfaces dull, glabrous, nearly black when dry; margins recurved; 2—3 cm. long, 1.5—2.5 cm. broad; ribs 3, the two outer forked pedately to make 5 in all, curved to join in loops at the very apex, the 5 lying in channels and themselves raised on the upper surface; main nerves few, short; transverse nervules and reticulation irregular, raised on the upper surface; petiole rather slender, about 5 mm. long, gradually broadening into the blade. *Flowers* hermaphrodite, in very short axillary or lateral fascicles of racemes, the racemes very few-flowered, 3—5 mm. long, bracts 0, or quickly deciduous. *Perianth*-tube enclosing the ovary; lobes triangular, acute, .5—1 mm. long, persistent in fruit. *Disk* concave, 1—2 mm. broad, with 5-lobed stigma in the centre. *Drupe* blue-black, globose, 2 mm. in diam., obscurely furrowed; exocarp fleshy, endocarp rugose with many interior plates: albumen much branched; cotyledons much shorter than the radicle.

PERAK: camp on Ulu Batang Padang, 1500 m. alt., Wray 1536!

I am still unable to identify *Maingay* K.D. 1314 from Malacca: see Hook. f. Fl. Br. Ind. V. 234. It seems to come nearest to *H. Wrayi* or *H. plurinervis*?

2. SCLEROPYRUM, Arnott.

Trees with axillary spines. *Leaves* alternate, coriaceous, pinninerved. *Flowers* polygamous, in short catkin-like spikes at the leafless nodes. *Perianth*-tube of male flowers solid, of female or hermaphrodite flowers adnate to the ovary; lobes 4—5, valvate or subimbricate. *Stamens* 4—5, opposite the perianth-lobes, filaments bifid, the anther-cells on separate branches, transversely dehiscent. *Disk* annular, undulate on the margin. *Ovary* inferior; ovules 3, pendulous from the top of a central column; style short; stigma large, peltate. *Fruit* a pyriform drupe on a thickened pedicel, crowned by the remains of the perianth-lobes; exocarp thick, fleshy, endocarp hard. *Seed* 1, globose; albumen copious; embryo terete, central, surrounded by the albumen; cotyledons oblong; radicle superior.—DISTRIB. Species 2—3, in India and Malaya.

Leaves glabrous; drupe subglobose, pyriform, 2—3				
cm. in diam.	1. S. MAINGAYI.
Leaves softly tomentose beneath; drupe pyriform, 1—				
1.5 cm. in diam.	2. S. RIDLEYI.

1. *SCLEROPYRUM MAINGAYI*, Hook. f. in Fl. Br. Ind. V. 235 (1886). A medium-sized tree reaching 12—15 m. in height, the stem armed with stout spines (Curtis); branchlets smooth, pale brown. *Leaves* ovate or ovate-oblong, obtuse or acuminate at apex, acute or rounded, usually unequally, at base; both surfaces glabrous, olive-brown when dry; 15—30 cm. long, 8—13 cm. broad; midrib strong, impressed above; main nerves 4—5 pairs, prominent, irregular, keeled above, curving to anastomose in loops near the margin, joined by irregular widely-netted nervules; petiole stout, 1—1.5 cm long. *Spikes* of ♂ flowers about 5 cm. long, the rhachis pubescent; bracts ovate acuminate .5—1 mm. long recurved; perianth-tube thick, lobes 2 mm. long, acuminate, glabrous within; of ♀ flowers elongated, much enlarged in fruit and then reaching 20 cm. or more. *Stamens* short, filaments thick, glabrous, anther-cells rather large. *Disk* 5-lobed. *Ovary* pubescent; style thick; stigma capitate, lobed. *Drupe* subglobose, pyriform, the peduncle contracted, the globose portion 2—3 cm. in diam.; exocarp fleshy, glabrous, endocarp bony, deeply ribbed. *Seed* globose, conform to the endocarp; albumen fleshy. Koord. & Val. Bijdr. V. 375; Koord. Exkurs. Fl. Jav. II. 169.

PENANG: at Puntie Achie, *Curtis* 3082!. PAHANG: at Sungei Tahan, *Ridley* 2651!. MALACCA: *Maingay* K.D. 1438!; at Marlimo, *Alvis* 2156!.

2. *SCLEROPYRUM RIDLEYI*, Gamble in Kew Bull. 202 (1912). A small tree, the trunk armed with sharp thick straight thorns 1—2.5 cm. long; branchlets thick, also spinous, the uppermost softly ferruginous-tomentose, as are the innovations, the inflorescence and the under surfaces of all but old leaves. *Leaves* submembranous, variable in shape; ovate obovate or oblong-lanceolate, acute or acuminate sometimes abruptly at apex, acute or rounded and often unequal at base; both surfaces pale when dry, the upper somewhat bullate; 10—25 cm. long, 5—10 cm. broad; midrib prominent, impressed above; main nerves 6—10, irregular, prominent beneath, curving to anastomose near the margin, joined by prominent irregular transverse nervules and reticulation; petiole 3—10 mm. long, channelled above. *Spikes* of ♂ flowers densely rufous-pubescent, 7—8 cm. long, the rhachis thick, the perianth-tube thick, 5 mm. long; of ♀ flowers 15—25 cm. long, the rhachis densely pubescent; perianth-tube cylindrical, rufous-tomentose, 2—3 mm. long; perianth-lobes ovate, reflexed, 2—3 mm. long. *Stamens* very short, filaments thick,

anther-cells very small. *Disk* 5-lobed. *Ovary* pubescent; style thick; stigma capitate, lobed, the lobes reflexed. *Drupe* pyriform, 3—4 cm. long, the upper part 10—15 mm. in diam.; exocarp glabrous or nearly so, endocarp bony, rugose; fruiting rhachis thickened. *Seed* 1 cm. in diam., cotyledons thin, oblong.

SINGAPORE: at Selitar, Bukit Mandai, Changi, Bajan, Chanchukang, etc., *Ridley* 1921!, 4761!, 5889!, etc.; at Changi, *Hullett* 850!

CHAMPEREIA, Griff.

Glabrous shrubs or small trees. *Leaves* alternate, shortly petiolate. *Flowers* minute, in 3—5-flowered axillary paniced cymes, hermaphrodite or sometimes ♂ by abortion; bracts minute or 0. *Perianth* inferior; segments 5, valvate. *Stamens* 5, perigynous, opposite the perianth-lobes; filaments filiform; anther-cells parallel, dehiscing longitudinally. *Disk* hypogynous, annular, often lobed. *Ovary* superior, half immersed in the disk; stigma broad, sessile; ovule solitary, erect. *Drupe* ellipsoid, pedicelled; exocarp thin, endocarp crustaceous. *Seed* conform to the drupe; embryo inverted in the middle of fleshy albumen; cotyledons 2—4, linear; radicle superior, clavate.—DISTRIB. About 2—3 species, of the Malay Peninsula and Archipelago.

In the *Naturl. Pflanzenfam.* Engler and Prantl have transferred this genus to OPILIACEÆ and have been followed by Merrill. This seems to be right, but I describe it here as it was omitted from the description of OLACINEÆ (including OPILIACEÆ) in *Journ. As. Soc. Beng.* LXIV. II. 1 (1895). 94

CHAMPEREIA GRIFFITHIANA, Planch. in *Herb. Hook.* A shrub or small tree reaching 4—5 m. in height; branchlets slender, pale brown, smooth. *Leaves* subcoriaceous; ovate-oblong or lanceolate, acute to long acuminate at apex, acute at base; both surfaces glabrous, pale when dry and punctulate; 7—15 cm. long, 3—6 cm. broad; midrib slender, prominent; main nerves about 5—6 pairs, distant, arched, joined by irregular reticulation; petiole 5—7 mm. long. *Male panicles* slender, 5—10 cm. long; pedicels filiform, 2—7 mm. long; fruiting panicles much longer and stouter, the pedicels enlarged; perianth-lobes reflexed in ♂, erect in ♀ flowers. *Drupe* 10—15 mm. long, 10 mm. in diam., yellow to bright red when ripe; pericarp smooth, the apex rounded. *Hook. f. Fl. Br. Ind.* V. 236; *Kurz in Journ. As. Soc. Beng.* xlv. II. 154 and in *For. Fl.* II. 330 (*Griffithii*). *Champereia* Griff. in *Calc. Journ. Nat. Hist.* IV. 237.

PENANG: Government Hill, *Maingay* K.D. 375!; *Curtis* 155!

Sulloh Bahang, *Curtis* 1163!; Batu Ferengy, *Curtis* 1716!, 2262!; *King's Collector* 1291!. PERAK: near Ulu Kerling, *King's Collector* 8550!, 8715!; upper Perak at 90 m. alt., *Wray* 3485!. DINDINGS: at Lumut, *Ridley* 8021!, 10267!. SELANGOR: Klang gates, *Ridley* 13456!. PAHANG: at Pekan, *Ridley* 1097!. MALACCA: *Griffith* K.D. 4388!; *Ridley*!; *Derry* 25!, 462!. JOHORE: Bukit Sialu, etc., *Ridley* 4696!; *Lake* and *Kelsall*. SINGAPORE: Changi, Chanchukang, *Ridley*!.—DISTRIB. Burma, Andaman Islands, Sumatra.

Merrill in *Philipp. Journ. of. Sc. I. Suppl.* 50 (1906) follows Vidal in identifying this with *C. Cumingiana* = *Opilia Cumingiana*, Baill. *Adansonia* III. 124 (1862), but an examination of the Philippine specimens in the Kew and Calcutta Herbaria leaves me somewhat in doubt about this, and so I prefer not to follow him in changing the name.
